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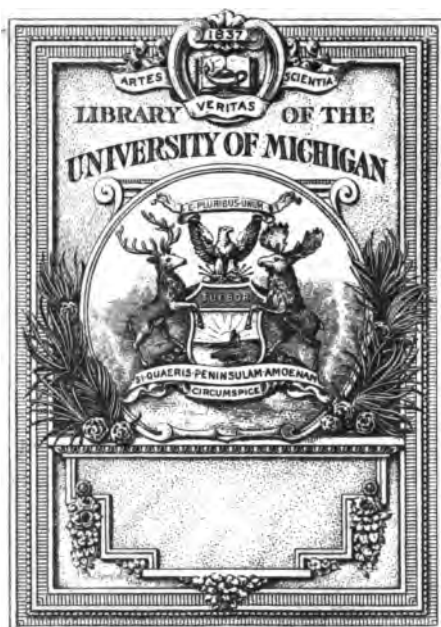
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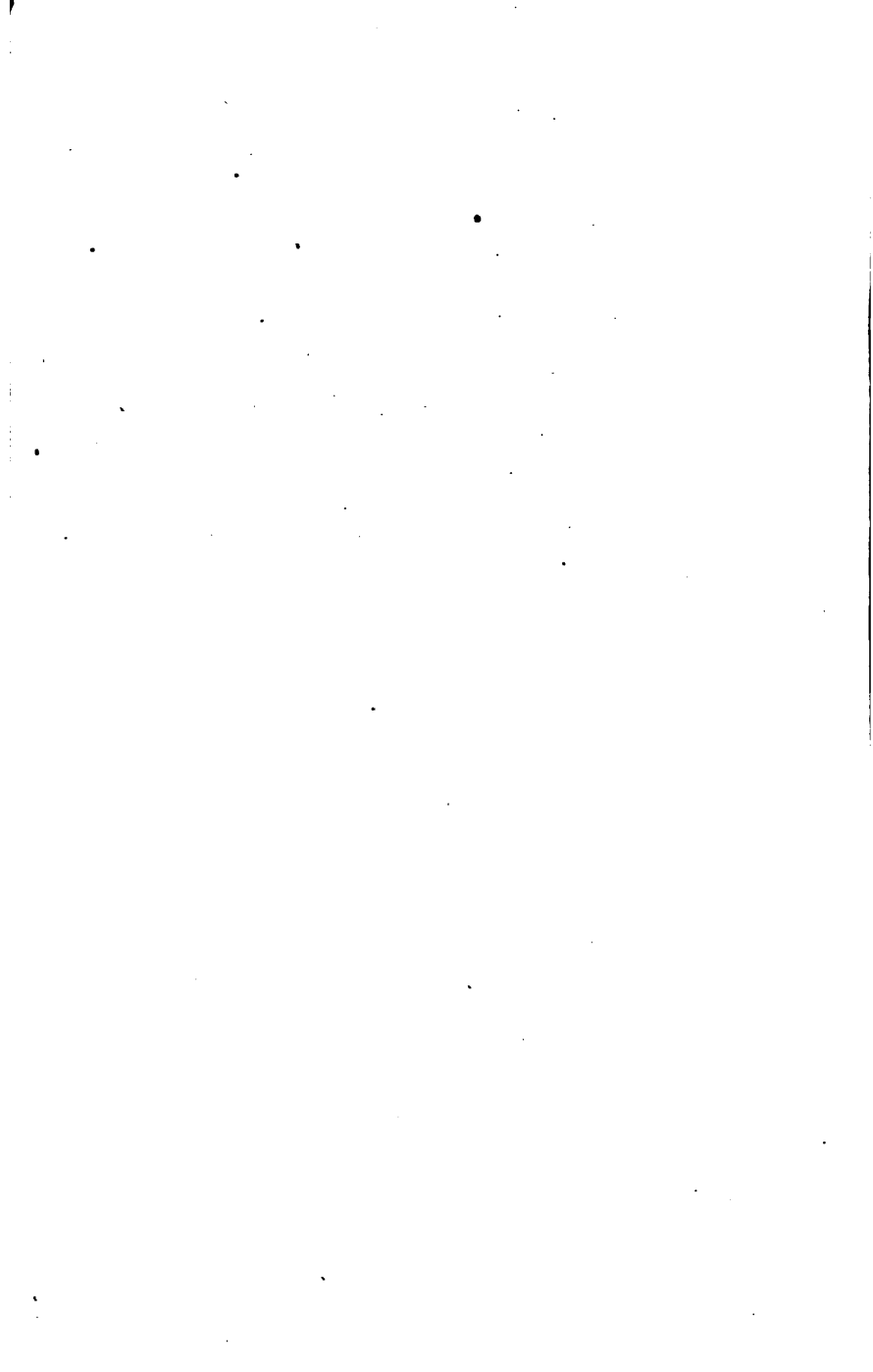
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ASPECTS OF GERMAN CULTURE

BY

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AND ON PEDAGOGY



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TO

MARK HOPKINS,

Ex-President of Williams College,

THE AUTHOR'S FIRST TEACHER IN PHYSIOLOGY AND
PHILOSOPHY,

This Book is Dedicated,

AS A TOKEN OF GRATITUDE AND RESPECT.

PREFACE.

MOST of the shorter of the following letters are selected from a larger number written during the years 1878-80, in the intervals of more special laboratory and other work, to appear in print later, and published as letters from Berlin and Leipsic in "The Nation." The writer has spent nearly five years of post-graduate student-life in Germany. This period was divided near the middle by an interval of about eight years' absence following the Franco-Prussian war. Except the advantages of renewing old acquaintances and impressions across this interval, so eventful in Germany, the writer has had no extraordinary opportunities for observation, and pretends to no exceptional immunity from error in fact or opinion. At the same time, and although some of the following topics are only remotely connected with his special lines of interest, and are therefore only fragmentary, he has done his best to give well-digested opinions and reliable information. In a number of these papers, only the latter is attempted.

The papers entitled "The Muscular Perception of Space," and "Laura Bridgman," reprinted from the English quarterly "Mind;" "The Perception of Color," reprinted from the Proceedings of the American Academy of Arts and Sciences; and the "Note on Hegel," reprinted with a few prefatory pages from "The Journal of Speculative Philosophy," — although more serious special studies, were written from stand-points and with reference to questions so essentially German, that it is hoped that their republication under the title of this volume is not without sufficient justification.

G. S. H.

CAMBRIDGE, Feb. 24, 1881.

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ASPECTS OF GERMAN CULTURE.

RELIGIOUS OPINION.

DURING the last decade, or since the last edition of Schwartz's well-known "History of the Most Recent Theology," published in 1869, Germany has undergone important changes in religious opinion, a brief glance at a few of which may not be uninteresting.

Beginning with the radical side, Professor Zeller of Berlin, the foremost teacher (at least, if we except Kuno Fischer of Heidelberg) of historical philosophy, the son-in-law of F. C. Baur, and reputed to be the confidential religious adviser of the Crown Princess, has published a brilliantly-written, matured, and moderate digest of the writings of the Tübingen school.¹ Into these essays he has incorporated his own well-known arguments, that the constitution of the Church was during the early Middle Ages modelled largely into analogy with the Platonic republic, and that the popular Stoic philosophy had much influence upon the development of its doctrines. He lays great stress upon the fact that the Tübingen movement, unlike English deism, French atheism, or German rationalism, was started by mature professors of theology and men of deep per-

¹ Vorträge und Abhandlungen. Von E. Zeller. 2 vols. Leipzig: 1875-77.

sonal piety, and draws a picture of Baur's profoundly religious and pastoral character which all must admire, and which made his sermons edifying to all who heard them. Zeller urges that the Tübingen method, which consists simply in applying to the New-Testament writings the same canons of criticism that are applied to all other writings of antiquity, and which he would therefore designate simply as the *historical* method, does not, if rightly comprehended, undermine, but only strengthens, the foundations of piety; and he reminds us how the Emperor Julian feared that the classical literature would be discredited if faith in the old mythology were destroyed, implying that the modern fear that the Old and New Testament would be less truly edifying if the supernatural element were eliminated is no less groundless. The Tübingen investigations, though discredited by the extreme and injudicious writings of Strauss, Feuerbach, Bruno Bauer, etc., and for the time arrested by the death of Baur and by the orthodox re-action, have, we are assured, convinced every impartial scholar under forty-five who has thoroughly studied them, at least in Germany, and still point out the direction which religious studies must take if Protestant theology is to maintain a respectable place among the other departments of learning in the universities.

This movement is still very effective, along with the development of modern science, in inclining many of the most thoughtful and deeply religious to an outside position of indifference or even of hostility to the creed and rites of the Lutheran Church, which, by universal consent, is steadily losing its hold upon the mental, moral, and social life of all the large German commu-

nities. Judged by the number of its churches, the growth of its religious organizations, or by the percentage of its church-going population, no large city in Christendom is so utterly indifferent to, and I had almost said unconscious of, the very existence of instituted Christianity, as Berlin, and that too in spite of the influence of the Kaiser's half of the court.

Again, the *Cultus* war, together with the May laws, by which the Established Church was required to submit to all the restrictions imposed on the Catholics, not only caused the distinctions between the latter and the Lutherans to be confused in the popular mind, and both to seem involved in a common condemnation, but it crushed the Döllinger movement, imbittered, united, and won sympathy for the Catholics, and brought the Church to the condition of a mere vassal of the State, while the latter became absolute and supreme in a dangerous sense, even over the hitherto free domain of religious life and thought. It is now for the first time possible to be born, married, and to die here outside of the pale of the Church. The Catholic priests by scores and hundreds have abandoned their parishes, and let them "run wild," rather than conform to oppressive laws, or pass the secular "cultus examination" which the Lutheran candidates for orders are required to do, who often afterwards in their pulpits not unnaturally abandon the old edifying appeal to the *Gemüth*, and begin to preach philosophy, while the religious question and a Romish party have been introduced into politics. The efforts to make the schools confessionless have led to some curious results. The history of the Christian era and of the Reformation reads strangely when so written as to give no offence to Catholics or to Jews ;

and many sad and curious incidents are told illustrating the impracticability of education on such a basis, — teachers dismissed, good text-books mutilated or discarded for bad ones, parents watching and complaining of the tendencies of instruction, etc.

Professor Luthardt, probably the most influential of the conservative Lutheran leaders, has just closed an important and able series of public lectures, now in print, emphasizing these and other evil consequences of the May laws, but chiefly important as a defence from the standpoint he represents against anti-Christian influences in general. The chief of these, he says, is rationalism. The Middle Ages saw the perfection of corporate life. Men worked, played, fought, and worshipped, in masses. The Reformation introduced the principle of subjectivity and individuality. Men wished to be certain of salvation each for himself, without priestly mediation. Kant's affirmation of autonomy; Lessing's ultra-Protestantism against all authority; pietism, which makes the edification of the individual soul the chief thing; the "storm-and-stress" literature, — all these are but caricatures of the teaching of Luther, and not progress beyond it. The rights and the sphere of the judgment of the *individual* as independent of the community, of the *Zeitgeist*, the authority of the Church, etc., have thus been emphasized beyond all bounds, and to a degree inconsistent alike with daily observation (which teaches that sin is the greatest fact in the world); and with the doctrine of heredity, therapeutic art, legal experience, etc., and are in schools and through the press undermining the foundations of parental and magisterial discipline and authority. The third element of rationalism is the su-

perstitious reverence of knowledge for its own sake, which results in *Aufklärung*, and repugnance to all obscurity and mysticism. It is very doubtful whether education really makes people better, and it is false that the knowledge of virtue makes men virtuous. The broad and shallow curriculum of the schools encourages half-culture, discontent, and insubordination. The effects of rationalism came into the schools with Rousseau's "Émile," which Voltaire well characterized as inclining all who read it to desire to get down, brute-fashion, on all fours; and the school even now seems likely to supersede the church. Children are too tenderly educated, and allowed far too much moral freedom. Rationalism, too, brought universal suffrage and a consequent immense waste of mental, moral, and material energy in political manœuvring and party squabbles; until now, especially in America, politics is a school of corruption, where young men learn that the chief virtue is the cunning knavery that escapes being found out. Business life also is a war of the strong against the weak, and introduced the Jewish method of showy and undurable cheapness, while competition has destroyed real values. The theatres corrupt taste and morals; the beer-houses, which have doubled in number within ten years in each German *Dorf*, injure family life, and "demoralize our effeminate youth." Work is specialized, and therefore degraded, so that men cannot be complete in their vocation, but seek compensation in sensuous enjoyment; and the statistics of crimes of animal indulgence show that it has rapidly increased. Men are not satisfied to do their duty, and be respectable, useful members of society, but long for public spheres of activity; and, worst of all, he adds, in

America they even want women to vote. Thus the motto, *laissez-faire, laissez-aller*, is as dangerous as the assumption that all men are free and equal is false. Equality has destroyed, and always does and will destroy, freedom ; and the tyranny thus caused is the most ghastly, because it blights all moral and intellectual life. All these evils, which, from Luthardt's standpoint, have befallen modern society, are directly or indirectly traceable to rationalism.

As the second great source of danger to the Church he designates pantheism, which underlies most German philosophy, and which has now found expression in the notion of the state as absolute. From the conception that the bottom principle of the world is an impersonal, changeless, or ever-unfolding system of forces, toward which our only feeling can be either that of absolute dependence or of æsthetic complacency in all its manifestations, eventuating in the "religion of taste," Luthardt describes the logical and the historical transition (begun with Hegel's philosophy of the state, but bearing practical fruit only during the last two decades) to the ideas which have now come to animate the German Empire ; viz., that the united wisdom of the most learned men must be an absolute if not infallible *logos*, subordinating and governing church, school, justice, trade, warfare, etc., with supreme might and right.

Materialism is the third and last anti-Christian influence. It arises now, as it did among Jews, Greeks, and Romans, at the close of a long period of culture, and is not a philosophy, but marks the end of all philosophy. It teaches that there is no responsibility and no punishment ; that to know all is to forgive all ; that

sin and crime are a disease. It is monistic, Darwinistic, socialistic. Its theories, as elaborated in Marx and Lassalle, are cosmopolitan as opposed to rational. The individual is encouraged to give up all his rights to society, and to receive pay in pleasure and enjoyment. It views life from a day-laborer's standpoint, and measures work only by the hour. Socialism is atheism taken in earnest. It is God's punishment upon society for the sins of the wealthy classes. Acquisition, enjoyment, sensuousness, have brought us to a time when men must, as Pascal said, either believe or despair. Pessimism, the latter alternative, is the choice of those who find faith impossible, and is a proof that earthly goods and pleasure do not satisfy. In his concluding lecture Luthardt depicted pessimism on the one hand and Christianity on the other, and urged that the choice for all men lies between the two.

The young men who enter the Lutheran ministry here may be roughly divided into two classes: first, those from respectable families, well bred, of good figure, voice, feature, excellent social and domestic qualities, and considerable tact in keeping clear of all sorts of trouble, but without deep convictions, great scholarship, or much initiative power; secondly, students from the country, who are often pietistic and often indifferent, but are drawn into the theological lecture-rooms from various obvious associations, because other interests are unawakened, or because, so far as they have observed, a preacher's life is on the whole more desirable than that of a teacher. Very many after a year or more abandon the theological for some other faculty; and I have even heard it said jestingly, that study under the former, because so many leave it, had come to seem

almost like a preparatory stage for medicine, philology, and jurisprudence. For students of limited means who reach or pass the clerical examination before finding their mistake, the results are sometimes scarcely less than tragic. The chief theological *Verein*, despite its beery conviviality, is pietistic in a forced and almost mediæval sense. The complaint that the right sort of young men for the pulpits, and especially for the theological professorships, are not to be found, while in other departments they are pressing the older men aside prematurely, is often made by the religious press. Certain it is that many of the young docents whose specialty is Semitic philology, or Hebrew archæology, or Church history, or diplomatology, have no deep interest in or little knowledge of the distinctively Christian doctrines, and probably for that very reason are inclined by the instincts of discipline, fear, or loyalty to their faculty, to emphasize, often absurdly, the external forms of creed and practice, in order to cover the lack of a living faith. This, and the alienation of the more liberal-minded, together with the gross and tasteless religious nihilism of the Social-Democratic brochures and lectures, have sapped the "mediating theology" of Dörner, etc., which was so influential and promising ten years ago, and have caused the conservative lines to be drawn in many respects closer than for many decades here. This is the oft-instanced orthodox re-action in Germany. While loosing its hold upon the community, and rejecting the best elements of faith, and making it impossible for men of deep thought and earnest purpose to enter or gain influence in its ranks, and breaking with modern progress, it has unquestionably become better disciplined within, and more assured and confident in its utterances.

The Lutheran Church is homely and old-fashioned in its rites and services, has never been very successful with Sunday schools or charities, is suspicious of revival work, has almost no popular or juvenile literature, and, in short, so far as the means of active aggressive work are concerned, is comparatively helpless. The recent Christian-Socialistic movement of Pastor Todt, which, starting from the assumption that Christianity and socialism had points of sympathy in that both were at bottom a protest against an existing order of things, attempted to organize penny-saving societies in the schools, and to instruct workingmen, and by such means to prove "the existence of undeveloped elements of regenerating power in Christianity," has not been a success. Meanwhile some of the older members of the Church, who share the standpoint of the Protestant *Verein*, have wandered far away from the common standard. The dogmatic systems of Professors Biedermann of Zürich and Pfeiderer of Berlin, both published, I think, in 1869, fall just before the period we are contemplating, and are scholarly and systematic presentations of Christian doctrines from a standpoint not essentially differing from that of radical Unitarianism. The works of Ritschl¹ and Lipsius,² however, fall within the last decade. The former neglects the metaphysical elements of the divine nature, but deduces all from the moral character of Jesus. Not God, he says, but man, is atoned. The kingdom of God has unfortunately little to do with the Church. Christianity is simply a generic way of looking at the

¹ Die christliche Lehre von der Rechtfertigung und Versöhnung. 3 vols. Bonn, 1870-74.

² Lehrbuch der evangelischen protestantischen Dogmatik. Braunschweig: 1876.

world, and regarding neither individuals nor communities. Jesus' influence is more abiding than that of other great men, because it is purely moral. So, too, with the more psychological Lipsius: Christianity is a purely "natural process of a higher order." We have no space here to epitomize these important hand-books. In fact, able and interesting as they are, they contain little radically new to the student of religious philosophy; but bearing in mind that religious opinions are learned, not by argumentation, but as we learn to spell, by long-continued reiterations, it is not surprising to know that their influence has been great.

In regard to the date of the Gospels and the authenticity of John, — questions still of the liveliest interest, — very little new has been evolved by the voluminous discussions of the last ten years. There have been constant and unquestioned, though on the whole not very great or general, concessions to the mythic hypothesis in the New, and especially in the Old, Testament criticism, and to the *tendency*-theory in the New Testament, and to the arguments for a late date of certain of the contested books of the latter, while new and promising conceptions of the constitution of the early Christian communities have been developed. This all too brief and imperfect sketch should not close without mention of a tendency represented, though as yet not very numerous, by young men of theological training, who insist that, despite their conviction of the truth of the extreme Tübingen and scientific methods, they yet have a right to a place in the Church. They profess to see a profound psychological meaning in the atonement, Trinity, etc.; a matchless didactic method in the doctrines of inspiration, the deity of Christ, and

eternal punishment ; a moral and æsthetic cultus in the rites and material equipment of the Church, and an incomparable instrument of discipline and social order in its organization ; and urge that therefore they have a place in its ranks and a right to assert its doctrines far superior to that of the ordinary clergyman or lay member who has no such insight, and whom they do not scruple to charge with Phariseeism. Whether this movement have life enough in it to bring it to any successful practical issue, remains to be seen ; but it is in this spirit and direction that the greatest religious reforms have been wrought out. Its ethical enthusiasm is of the purest and strongest kind, and it perhaps more than any thing else makes the near religious future of Germany hopeful or interesting.

THE VIVISECTION QUESTION.

THE development of physiology during the last quarter of a century in Germany has been by general acknowledgment almost unprecedented for rapidity in the history of science. Instead of being united with anatomy in one professorship in the universities, it is now often argued that it is too wide a field for a single specialist. In determining the curriculum of the large new Physiological Institute in Berlin, "the palace of the queen of natural science," according to the director, it was debated whether a year's course of lectures of five hours a week on general physiology must not be superficial, and whether the work should not be divided, as Pflüger and others have suggested, among its several constituent departments. A physiologist, it was said, must be by turns physicist, chemist, mathematician, toxicologist, microscopist, and now, by general consent, even philologist, like Brücke, and philosopher, like Wundt. The younger men who now overcrowd the market, and occasion the liveliest competition, devote themselves mainly to some one of its sub-specialties. The Berlin Institute is the largest of some half a dozen well-equipped and independent establishments of the kind which have been built in Germany during the last ten or fifteen years. Besides several auditoriums with every convenience for experimentation, and for bring-

ing microscopic and other preparations under the eye of each student, it contains large and fully-furnished laboratories for physical and chemical work and for vivisection, intricate webs of electrical wires connected with constant batteries in the cellar, a magneto-electric machine of several horse-power worked by steam, and extensive basement apartments for frogs, rabbits, dogs, guinea-pigs, pigeons, etc., all cared for by perhaps a dozen servants, famuli, and assistants, and all directly under the care and inspection of the Government, with fully detailed records of all original work published in the various physiological archives. The pre-eminence of German science is nowhere more supreme than here.

These are the men and institutions against which the anti-vivisection movement is directed. The question is comparatively recent here, and has very different features from the agitation in England, as a result of which vivisection is there allowed only to a very few eminent men by Government license, and under severe strictures and liabilities. An illustrated brochure of nearly eighty pages, entitled "The Torture Chamber of Science," was published about the beginning of the present year,¹ which has had an immense sale, has already been translated into five foreign languages, and has reached a sixth stereotyped edition. It is written with striking journalistic art by a young nobleman, who is one of the directors of the Dresden Anti-cruelty Society. Public sentiment has been so aroused by the discussion which it evoked, that eminent physiologists like Ludwig have been threatened on the street; and one of his more timid friends expressed to the writer his fear that the trouble might become as serious as in the case of Pro-

¹ 1879.

fessor Schiff, who was lately obliged to remove from Florence by a league of workingmen who threatened his life because he was supposed to have tortured their dogs by the thousands for his amusement. The author has turned many hundred pages of archives, and describes the roasting of live rabbits, the effects of curara, the throwing of dogs with extirpated brains into water-vats, etc. He conjectures how many animals different physiologists have sacrificed, charging one by name with having tortured to death fourteen thousand dogs, gives a long list of contradictory or doubtful results reached by different experimenters, describes and illustrates affecting scenes where animals have pleaded for life, and students have turned away sickened not only from the vivisectorium but from the study of medicine, and concludes that the evil he describes is one of the greatest moral stains upon modern civilization, making physicians unsympathetic and often careless and hard-hearted. Physiology, it is said, can scarcely be called a science as yet, and the contributions of vivisectionists to the understanding and amelioration of human suffering have been almost nothing. It is as if one sought to learn the secret of Raphael's art by cutting up his canvasses. Science, it is said, will be brought into popular disfavor; and ladies are exhorted to give up the patronage and acquaintance of all physicians who operate on live animals, and to become themselves members of anti-cruelty societies, now too often controlled and even presided over by "hypocritical vivisectors."

There is no doubt that, after making all allowance for the extravagance and sentimentality, and even the ignorance shown by many errors in the statement of fact,

in such arguments as the above, there is sometimes unnecessary cruelty. It is largely a matter of individual character, whether a physiologist carefully inform himself beforehand of all the results of previous experiments and of the anatomical situation, and specify sharply in his own mind the question he wishes to determine, and the method of the least possible suffering by the use of anæsthetics when possible. Restrictions by competent authorities also cannot possibly be too great or numerous. But to one who is acquainted in laboratories and with their directors, the general charge of inhumanity is simply absurd. There are now very far fewer private experiments or experimenters than formerly. Nearly all studies are made by specialists and in institutes, with the greatest publicity, and thus contribute their moiety to general progress. In order best to observe, one must be collected and rapid and for the moment unsympathetic; but every investigator knows that pain is always a disturbing element, and must be reduced to its minimum. Moreover, a clumsy or cruel experimenter is condemned nowhere more severely than by his own co-laborers. For ourselves, we cannot but regard the anti-vivisection feeling here as born of the same sentimentality of ideal over-refinement, wealth, or idleness, which prompts the Brahmin to sweep his path before him lest he tread unconsciously on a worm, or a well-known Berlin clergyman to eat the flesh of only *large* animals, that he may share with many others the accountability for the taking of life; and which in this matter makes common cause with social democracy, if the latter, as we suggest, may be defined as the consensus of the incompetent upon properly professional questions.

How much animals suffer when compared with men in the same conditions, admits as yet of no psychophysic formulation, and perhaps never will; but all indications drawn from the structure of their brain are that it is far less. Nearly all that is known of mitigating their pains and of curing their diseases is due to physiology. Their most inexcusable tortures are for man's amusement, — the chase, pigeon-shooting, etc.; but how much more reprehensible these are than the excessive care lavished on lap-dogs, favorite race-horses, etc., we leave for moralists to determine, and content ourselves here with enumerating a few of the most general results which the practice in question has already contributed to the cure and prevention of disease. In certain cases of cramp attended by dilation of the pupils, vivisection alone has been able to teach that the trouble is in the cervical sympathetic nerve, and designated both the nature and place of the application of the remedy. Since Bernard found the cerebral point, the puncture of which caused diabetes, a long series of experiments on living animals have led to a new and far more successful treatment of this disease. The methods and conditions of the transfusion of blood, of the removal of diseased kidneys and ovaries, of artificial nourishment by stomach fistula, sub-periosteal resection, the application of the artificial larynx, have all been learned by experiments on animals. The possibility of such operations could never have been first proved on human subjects. According to official statistics, over twelve thousand men die annually in India from the bite of poisonous serpents. Professor Burdon-Sanderson conceived the idea of seeking an antidote by experiments on animals. Perhaps nothing

could be more painful, and the discovery is not yet complete ; but there is increasing reason to expect that it will soon be. After trichinæ were observed, and official microscopic examination of pork introduced, it became essential to know in what part or parts of the body the parasite was to be sought for ; and it was found that hams, carefully examined, were often still infected. By experiments on living animals the development-history of the worm is now so thoroughly known that a single examiner, by the inspection of a part of the diaphragm, can tell at once and with certainty whether or not meat is marketable. Such are but a few of the immediately practicable ways in which animals have been offered to save human lives.¹

It cannot be denied that there are very many details respecting the functions of the brain, the stimulation of circulatory centres, various secretions, reflexes, etc., in which eminent authorities disagree, and which can be decided only by experiments on living animals ; but the incontestable fact remains that whenever physiology is thoroughly cultivated it has almost re-created the study and practice of medicine. Helmholtz, who has never published investigations requiring vivisection, and who may be called an impartial and competent judge, in speaking of the wonderful technique which its methods have developed, adds that the practice has made accessible to scientific observation a great number of most profound problems which a few decades ago seemed quite hopeless of solution. Following the example of Claude Bernard, French professors often try to combine original observations with demonstration

¹ See *Die Vivisection im Dienste der Heilkunde*. Von Prof. R. Heidenhain.

in the class-room, while in Germany it is held that a few fundamental experiments on living animals are indispensable for "heuristic" purposes alone. Every medical student has a struggle with his instinctive feelings in making acquaintance first of dissecting-rooms and museums of morbid anatomy, then of hospitals, and especially of surgical clinics; but every one knows these feelings must be repressed, or he will never have the steady hand and eye which give poise and self-control in a critical emergency. The half-unconscious knowledge of this is no doubt at the bottom of much of the demonstrative and offensive, but often utterly insincere, affectation of hard-heartedness by young medical students. It is not only as necessary, but, we think, as natural, for a good physician to grow more rationally sympathetic, as for a moralist to develop conscientiousness. Vivisection is cruel, but disease, man's greatest enemy, is more so; and, if we were to retort in Herr von Weber's style of argument, we might ask him if he would refuse to torture a favorite dog for even a forlorn hope of saving the life of a member of his family? We shoot noxious animals, slaughter calves and appropriate the mother's milk, etc., with the conviction that it is our duty to make way for the higher organization. For the same reason the physiologist has not completed his task when he has told us how animals grow: he must also describe the important changes which take place between injury or the death of the brain or other organ and the beginning and progress of decomposition. No science has such problems and possibilities before it; and we consider the controversy we have attempted to epitomize as one of the most important of the many battles which science has waged with sentiment.

THE VIVISECTION QUESTION.

SINCE my letter to "The Nation" upon this subject last summer, the agitation has steadily increased, until just here and now it is the absorbing topic in student-clubs, newspapers, private parlors, etc. I have taken pains to look through a dozen of the latest brochures and articles upon the subject, the most conspicuous and perhaps absurd of which is by Richard Wagner.¹ The scientific spirit, he premises, is the *daimon* of our mechanical age, which is devoted to the culture of utility. Its true nature is best revealed in *vivisectoria* and artillery-factories. We are slaves of our iron, materialistic civilization; and it is speculative physiologists, climbing about like apes on the tree of knowledge, who tell us that the soul is at bottom a chemical process. It is sympathy, on the other hand, which is the prime condition of the development of all organized society. It is this sentiment, above all, which we have a right to expect from practical physicians. Pity, in fact, is a religion. Our Saviour came and bore our sins out of pity for our lost estate. It is simply Christian to extend our sympathy to the animal world. A dog which sees a god in the master who tortures him for science still lacks even the imperfect consolation of knowing

¹ Ein offener Brief an Ernst von Weber. Von Richard Wagner. Berlin and Leipzig: 1880.

that he dies for his master's benefit. Nay, more, the dog may be immortal; at least, the vivisector is "infinitely farther from redemption than the animal, which is immaculate as a saint when compared with him." Still stranger, vivisection came into vogue at a time when scientific men were learning to regard animals as their progenitors. Medical students are systematically taught to be un pitying; and the reformers have lacked the courage to say that this of itself, apart from its proved uselessness, is cause sufficient for the abolition of vivisection. Physiologists should be regarded as state criminals; and the police should break into the Institute at Leipzig, free the uninjured, kill the mutilated animals, and lead off the directors to justice.

The Animal Protection Society here is a large and flourishing organization, and with Professor Ludwig, the great physiologist, as one of its officers, has done excellent work in improving the condition of working animals. It distributes prizes to owners who keep them in good condition, devises better stalls or harnesses, lays hard-bottomed roads in sand-pits, distributes juvenile tracts to school-children, occasionally fines cruel coachmen, limits by law the number of passengers in street-cars, and has lately printed a remonstrance against the practice of ladies who wear wings, heads, or bodies of birds on their hats. Last week Von Weber, the chief agitator, with friends from æsthetic Dresden, attempted to organize a new protection society here, which should recognize vivisection as an unwarrantable cruelty. His opening lecture was crowded by students and citizens in about equal numbers; and although his extreme and bitterly personal utterances were heard to the close, the meeting adjourned in mass

to cheer Professor Ludwig at his house, who has lately received many threatening anonymous letters, and been insulted or attacked on the street by ignorant people who believed their dogs were in danger.

When the agitation began it was so active, Von Weber's pamphlet was so zealously circulated in every school, and his pictured placards were so conspicuous on every street-corner, that, before scientific men were well aware of the danger, the sentiment of cultivated society, backed by English sympathy, was already directed against them. Their defence is now but just begun. Only a few pamphlets and popular articles, and a circular signed by seven thousand Germans, professors of medicine, comprising every eminent authority without exception, declaring that vivisection has regenerated the practice of medicine, and should be limited only by the individual convictions of experimenters, have been published; and already the re-action has not only begun, but has extended to nearly all classes of intelligent reading people. Thus Von Weber and his party now find their constituents, though more numerous, almost without exception among the lower classes. The character of his agitation has also degenerated. His polemics are now against the whole medical profession. He tells poor people that they are experimented on with drugs in the hospitals, and says that students are intentionally hardened. Moreover, it is now becoming known that he has never seen a vivisection, nor the instruments used, and that in some of his statements, as, e.g., about an apparatus wherein an entire dog could be frozen stiff in an instant, he was the victim of the jocose or ignorant laboratory servant from whom he derived his information. He has also

misunderstood his authorities, and in at least five cases quoted men who believe in vivisection as opposing it. It can now be said with confidence that this country is saved from the great misfortune which in England has diverted young men from the study of the science that is the basis of medical education, — a science, too, we might add, which now in Germany combines an independent educational value and a direct practical utility before all others, and which in the United States, save in two or three of the best institutions, where it is now ably represented, we have hardly begun to understand.

The authorities quoted against vivisection, which have lately been pretty thoroughly canvassed, turn out — here it is said without exception, and in England and France with almost no exception — to belong to one of two classes: either they are men who wrote from three to five decades ago, when physiology even in Germany, its home in a peculiar sense, was in its infancy, when the medical sciences had not felt its regenerating influences, when only a few specialists had begun to have suspicions of its scope and object, and the public at large knew nothing of it; or else they are men eminent in other departments, like Wagner, whose sympathies are quick, and who chance to be ignorant of experimental science. These are backed here by an army of men whose wives have tended carts or perhaps drawn them for years a-span with harnessed dogs (which are made members of the family in nearer relations than perhaps any domestic animal ever stood in before to man), and in England by the affectation and sentimentality which wealth and idleness are apt to produce, more commonly in ladies. Ferguson, it should be remembered, began his career at a time when it was the

custom for young doctors to be apprenticed to older men instead of getting their education in lecture-rooms and laboratories ; Charles Bell, whose testimony against it, so far as I know, is only constructive, has himself vivisected ; and Darwin, who has also been quoted here against it, says, "I am fully convinced that physiology can progress only by the aid of experiments on living animals. I cannot think of one step in physiology which has been made without that aid."¹

It is said that before vivisection came into vogue, operations were here decided upon in medical consultations, especially in hospitals, sometimes at least as much for the good of science as for that of the patient. However this may be, such a temptation is entirely removed now that animals are found to be quite as good for every scientific purpose. Certain branches of surgery, to be thoroughly learned, many now assert, must be practised beforehand, not merely upon dead bodies, but upon living animal tissue. However this be, vivisection has become a surgical art, and has certain fundamental practical precepts. Among these are, that the more circumscribed the wound, the easier it is to find a deep nerve or vessel ; that an animal must always be operated upon as if it were intended to preserve it alive and in as normal a condition as possible, and that the more sensitive tissues must be avoided, and loss of blood reduced to a minimum ; that one such careful experiment is more instructive than a hundred bad ones ; and that the operator should be "inspired, not by a sad necessity, but by a certain joyous excitement," with his mind fixed upon the central object sought, and not distracted by cries or blood.

¹ The Vivisection Question popularly discussed. By Professor Hermann of Zürich. Translated by A. Dixon, M.D. 1877, pp. 59.

Again, vivisection did not originate in man's laziness, nor in a whim of his palate, like the practice of docking sheep, branding stock, or mutilating males ; nor in the desire of gain, like the extermination of insects or birds that prey upon the crops, or in the fur-trade ; nor in his ambition, like the use of the horse in war ; but it sprung from some of the very deepest and noblest of human feelings, such as only physicians can appreciate who have felt their science helpless in certain critical moments, and who reflectively repeated to themselves when it was too late the question they read in the eyes of anxious friends, whether, after all, more might not have been done ? Such are the motives that prompted the earlier epoch-making discoveries by this method ; and, now that the purely scientific desire to understand the phenomena of life is added, we have a right to expect great results from it, and, recent as the method is, we are not disappointed. Take, for instance, the method of treating wounds, and more especially the diseases that were liable to arise from them. The latter are now almost unknown, and the former are healed in half the time required before Lister's study of artificial wounds on animals. Many diseases not before understood are now known to be due to microscopic organisms, and thus by observation of artificial diseases a rational system of disinfection has been developed. The treatment of fevers and high temperature has been almost directly reversed ; the better understanding of symptoms, by which diseases can be earlier detected, the medicinal properties of digitalis, salicylic acid, and many other drugs, have all been learned chiefly by the study of artificial pathological states in animals ; until we may now say that medicine, which has been almost

revolutionized here within the professional life of many physicians now living, is no longer a speculative science, in accordance with which men were bled for inflammation of the lungs, and wherein life was studied in corpses, and Galen, and perhaps Hippocrates, were cited as authorities, but has become, as it should be, most practical and most healthful, while its influence radiates from the sick-bed more and more widely over the active life of men. Thus another, perhaps the greatest of all, is likely to be added to the many debts we owe to animals below us.

There are many points where the interests of men and animals conflict, — traces, some of them, perhaps, of an ancient desperate struggle for existence between them. Once priests inspected quivering entrails, or shed the blood of animals as burnt-offerings, while now in veterinary schools vivisections are performed directly for the benefit of animals themselves. It is perhaps easy for some temperaments to cultivate the sentimental view, and turn pale, like the crown-princesses on a visit to the laboratory in Berlin the other day, at the sight of a dish of diluted blood left in sight by mistake ; or weep, as Von Weber assures us thousands have done, over the tale of an English lady who became insane because it was hinted that her lost poodle had been stolen by a vivisector. Some are still found who disapprove of the dissection of dead bodies ; and an English clergyman is said to have preached against the artificial fertilization of flowers as unwarrantable meddling with God's handiwork. Every such sentiment, however, so fundamental is physiology becoming in the study and practice of medicine, must, we think, be now regarded as an essentially socialistic agitation against

a serviceable and tolerably favored class of the community. The medical profession here suddenly found itself obliged to take the defensive to maintain its good name in the community; and all feel that the same frenzy which has been directed against it may to-morrow be aimed at lawyers, clergymen, or editors. May our country be spared such a sensational agitation as this, as well as such a "scientific scandal" as the English statute against vivisection in its present form certainly is!

THE PASSION PLAY.

THIS quiet Bavarian village of some two thousand inhabitants, remote from the railroad, isolated from the rest of the world in a broad, high valley, which is surrounded by a wall of mountain-ranges, and through which flows the swift and sparkling Ammer, is very old. It was built on the mediæval highway between Venice and Augsburg, and has always been under the immediate auspices of the great and famous monastery of Ettal, two miles away. The soil is clayey and infertile; and the inhabitants make a scanty livelihood by carving wooden images of the saints, altar-pieces, crucifixes, and more recently toys and useful and ornamental articles of household-furniture. The Passion Play has probably been performed here since the thirteenth century; although tradition dates it from early in the seventeenth, and declares that it was first represented in consequence of a vow made during a plague. Like other mysteries and miracle-plays, it was originally written in doggerel, the manuscript of which the burgomaster still preserves, and was performed in the churchyard, with the church-door as a background, and with priests and monks in the chief rôles. The prince of hell and his court were represented on the lower part of the stage, and imps tore out and devoured the entrails of Judas after his suicide. Rival repre-

sentations in other places decayed one after another ; while this, owing in part to the constant revision of the monks of Ettal, and partly to the unique character of this choice survival, has steadily grown to be more and more widely famous ; till now, as the inhabitants of Olympia were largely occupied during the intermediate years in preparation for their great festival, so here the Passion Play is the great event of the decade for the Ober-Ammergauers. The "passion year" is a sort of Jubilee. Debts are paid, the poor pensioned, marriages delayed or hastened to fall within its limits, and every household receives a part of the proceeds of the season after it has ended.

The people are devoutly religious in the best Catholic fashion. The outer walls of all the best houses are adorned with large and gaudy paintings representing biblical scenes, and done by native artists. The usual form of salutation is, *Greet God*. There are few newspapers and almost no books to be found in the village ; but I heard in a kind of beer-shanty a lively discussion of the manner in which Joseph of Arimathæa embalmed the body of Jesus, indicating that the popular consciousness here centres about the art of popular sacred histrionics. An immense crucifixion group, done in stone, was presented by the King of Bavaria, and stands on a slight eminence just outside the town ; and a tall wooden cross rises above the lofty peak of the Kofel, which almost overhangs it. Votive tablets abound in every street. In short, since a brief visit in Oberlin some years ago, in which I was immediately questioned with considerable minuteness by the venerable ex-president about my personal relations to the Saviour, and since hearing in the college yard there

from all directions the prayers and hymns with which every recitation is opened, I have not spent a week in an atmosphere of such all-pervading piety as here. The peculiar flavor of *Gemüth* native among these highlands, together with the dreamy beer, the intractable and almost threatening aspect of nature, poverty, and I know not what other causes, have combined to give the inhabitants a calm, tender, and contemplative character, which their occupation in carving, and now, since the establishment of a school of design here, in studying various attitudes of devotion and suffering in saints and martyrs, has deepened and confirmed.

I shall attempt no account of the play itself, which is described in a dozen handbooks. It consists of seventeen acts, lasts eight hours, brings between five and six hundred people on the stage, and is listened to on an average by about thirty-five hundred peasants, who sit through rain and sunshine on the benches in the unroofed space immediately in front of the stage, and by more than a thousand "guests" farther back under cover. A great majority of the latter are English and American visitors. Most have read by this time how the rôles are assigned by vote of a large committee of citizens, after long and careful discussion of natural adaptation in character and personal appearance; of the long and tedious drilling required at rehearsals; of the studies of costume and attitude, many of which are easily-recognized copies of pictures in the galleries of Munich; of the inflexible rule that only those born in the village can have any hand in the play; of the long hair and beard cultivated years beforehand; how the tall, handsome Joseph Maier, who looks and acts the part of *Jesus* so creditably, must se-

clude himself after the play till the peasants from a distance have left town, that they may not fall to saying prayers to him as if he were really Christ. Indeed, I have been told (I know not how advisedly) that some of the leading characters live and grow into their parts so deeply, — for which, indeed, they are sometimes destined from childhood, — that but for the long interval of ten years, aided by the corrective influence of assuming various parts in other smaller religious dramas (including even a version of “*Antigone*,” often performed for practice and for the amusement of their townsmen), they would no doubt fall into the insane delusion that they were in very deed the characters they delineated. However this may be, most of the leading performers, whom I have taken pains to meet, appear in their homes remarkably as they do on the stage, and they seem to me profoundly penetrated with what they suppose to be the consciousness of the characters they have assumed. I have observed in none of them the frequent fluctuations of *emotional* tone or disposition common to so many actors in personal intercourse with their private friends.

I heard the play twice — once among the peasants, and once upon the visitors’ seats farther back. Many of the former come from a great distance, and sometimes on foot as a sort of pilgrimage, and prepare themselves for it by fasting and by attending early mass, where they are told how to make the spectacle a means of grace. Most of them wept, some convulsively, at the affecting passages, and laughed heartily at the well-acted remorse of *Judas*. The play is designed, of course, for the people, and is intensely realistic. They see and hear the blood spurt when the

spear is thrust into the side of *Jesus*. The casting of the lots and the parting of the garments are tediously true to life. Real doves fly away when the tables of the money-changers are overturned. Every spectator can see and count the thirty pieces of silver as they are rung down upon a stone table, and the laugh is loud as *Judas* greedily scrabbles them up one by one into his bag. The scourging, the bloody sweat, the blows of the hammer upon the nails of the cross, are all wearily real and unmistakable, without the long explanation of the *choragus*. Nothing whatever is left to the imagination. Even the language in some scenes is scarcely less than vulgar, and most of it is in striking contrast with the elaborate elegance of most of the English versions. That the people who hear the play are edified and instructed, there can be little doubt. It is also a valuable discipline for those who perform it. The community is united in a common, serious occupation. In the larger scenes, hundreds act and sing together with an earnestness and unanimity very rarely witnessed in the best operas or theatres. Each feels a common local pride and responsibility; and, although the individual actor often seems to forget himself in the earnestness with which he enters into his part, I doubt if he for a moment entirely forgets that his *Dorf* is under inspection.

The great majority of the guests also were religious people, but Protestant, with perhaps even a larger proportion of clergymen than there was of priests among the peasants. Here I saw no one visibly affected by the pathos of the scenes: none laughed; but many turned away with apparent pain or disgust at the thrust of the spear. I believe that all who expected to find

any grand dramatic element, or religious edification, or to get a deeper sense of the ideal content of the story of the cross, were disappointed. The details and the *dénoûment* were too familiar beforehand, and interest centred inevitably upon a critical contemplation of the technical elements of the play. There is a melodramatic sort of religious idealism in tinsel, gaudy costumes, transformation effects, *tableaux vivants*, and pleasant but indifferently good music for peasants, if the theme is moral and devotional, which no degree of realism or vulgarization can entirely obscure. This general effect all who have thoughtfully observed the unhappy results of scepticism upon the average half-cultured mind must heartily sympathize with. There is a steadying, elevating power about this most sublime of popular epics, the place of which for the ordinary consciousness nothing else can supply. It closes up the vast abysmal and unprofitable speculative questions of life and destiny in which the Oriental mind was absorbed, in a way which stimulates art, and regulates conduct, and has given a practical direction to the course of history. Yet at the same time, from the Protestant standpoint, the Passion Play seems pretty well shorn of better and higher motives, clumsily composed (in a dramatic sense), and its leading rôles very inadequately conceived. Thus, despite sympathy with the theme and the kindest feelings toward those who represent and enjoy it, there is an element of pity, disappointment, and recoil from such a materialism of faith, which the high strategic authorities of the Church, who are so hopeful and happy over the popularity the play has attained among Protestants, seem not to detect, and which will make it harder than ever for

clergymen to produce any effect by mere descriptions, however vivid, of the life and passion of Jesus. Powerful as these have been in art and in the history of Catholicism, and readily as they would lend themselves to a more Protestant treatment (as, e.g., Bach's *Passion Music* shows), making the cultus of Protestantism less non-sensuous, and less remote from every-day life, and less transitional and unsteady, no one can or does deny that they are rapidly losing points of contact with modern life.

At the same time there is one obvious "improvement" which we trust it is not too sanguine to expect many Protestants may extract from their experience in this village. There is a standpoint of more trained and developed understanding and reason, still more non-sensuous and still more deeply religious than theirs; a standpoint from which their creed and service appears in all respects precisely as that of these peasants appears to them, — as a useful and valuable symbol of truth, the perfection of which for those who hold it is to be judged by its moral and social effects. That the Protestant is less satisfied with his faith than the Catholic believer, is shown by the great jealousy of the former of being approved or "patronized," however warmly and sincerely, by those above him, who dispute nothing but the old and baseless claim of absoluteness and universal validity, and whose social and devotional sentiments often lead them to try to attend church, despite so much that is personally distasteful to them in the utterances of the pulpit. Finally, the *Passion Play* is a product of the ancient communal German life. It is eminently national, although it is animated by the old guildic local spirit. It has demonstrated the possi-

bility and the tremendous impressiveness of the historic drama. The size of the stage, and the number of people shouting and acting in chorus upon it, are the largest and most impressive, I think, in the modern world. As Devrient well says, upon such a stage and in the open air of day, not only the ordinary private confidences and intrigues of guardians and lovers, but even *Thekla*, *Romeo*, and *Katherine* of Heilbronn would be shamed and ineffective. A larger measure of interests transcending the individual, and even a realistic roughness in act and word in place of ordinary dramatic polish and unity, become imperative. The "Nibelungen," as Wagner has shown, can, why cannot more strictly sacred themes be made impressive by the highest of the arts?

SOME RECENT PESSIMISTIC THEORIES.

THERE is probably no word in common use, of such vague and indeterminate sense as the word "pessimist." A trenchant critic, a political malecontent or member of the opposition ; a philosophic man of what the phrenologists call the purely bilious type, who can no more help questioning ultra-utopian expectations, whether of this or another life, than he can stop thinking ; a scholar of retired leisure, whose greatest enjoyment is in seriously contemplating the enjoyment of others — all these we often see disposed of under the same category as the homeless, penniless, consumptive Leopardi, who seems to curse Nature herself as not merely indifferent but hostile, that his daily prayer for death was not sooner answered ; or Lenau, who cultivated a pantheistic *Weltschmerz*, wandering among primeval forests ; or the now partly amusing Schopenhauer, who, had he been logically loyal to his own premises, would have committed suicide by starvation. Pessimism of some type is fast becoming the confessed creed of those who experience the inevitable re-action of a precocious culture, or find themselves falling behind in the struggles of survival ; of those whose superficial mental culture has left the heart untouched by all the great enthusiasms of humanity, and who have, perhaps unconsciously, adopted the maxim of the cynic,

Dum ridet philosophatur; of those who have been suddenly awakened to a realizing sense that their early ideals, standards, and creed have been lost without being replaced by others, that the present is all man is sure of, and that they are unfairly handicapped in the world's hunt for pleasure and money. All this is infinitely removed from the tone of those who, from experiencing the limitations of knowledge and the perplexities of duty, which only those know who have faced ultimate problems of science or of conduct, have had their mind and character tempered with a serious earnestness to which the current optimism of the day seems shallow and flippant. With this reminder we will leave the reader to determine for himself among the following speculations how much is temperamental, pathological, or truly philosophical — a task for which even Mr. Sully has given us no adequate categories.

Julius Bahnsen is the only genius among the philosophic pessimists. In a series of papers appearing at intervals during the last ten years,¹ written in the most bizarre style, full of original tropic imagery, the sentences fairly shattered with dashes, parentheses, etc., and in which all the best *aperçus* must be laboriously read in between the lines, he has elaborated a system of philosophy which teaches that "self-torture is the self-end" of all things. The phrase that this is the worst of all possible worlds, he takes in bitter earnest; and instead of finding a wholesome tragic stimulus in the fact, as Hartmann says we should, he finds it depressing to the verge of desperation. The misery is universal and endless. His miserabilism is not merely mildly pathological, but sometimes actually hysterical.

¹ Beiträge zur Charakterologie.

There is an immanent teleology in his universe ; but it is not merely alogical, but anti-logical, and even anti-causal. Its development is dialectic in a sense, and its self-expositions are disintegrating. Sin, disease, and imperfection are alike guilty, for they result from the "pre-natal acts of choice of our germinal individuality," which determined even our existence. Yet we know nothing of the beginning or end of things : no man has torn the veil of Maya from more than his eyes. Characters are the ultimate forms of existence we know in the world ; and he describes with wonderful sagacity and acuteness sixteen ground types, each of which is further distinguished by different degrees of energy and by "eucholia and discholia." If the world is monistic, and develops, it is best to fancy will its substance and the idea its accident. It is true that all the antinomies are from the *Gemüth*, which, while it is the great oracle of pantheism in the soul, nevertheless compels the author to the eternal self-torture of making psychological analyses of his own mind and heart with increasing fineness and painfulness, until he has come to hate the very word "healthy."

Another popular work by a friend of Hartmann¹ argues that the "harmony of the cosmos is the result of an indirect selection by the elimination of those heavenly bodies unfitted to survive." Myriads of ripe and unripe worlds were resolved back into cosmic mist by collisions ; and the few billion stars existing are the sporadic survivals, which chanced to have, or to be attracted into, the fittest orbit-paths. Countless others have wandered off into space, or fallen back into their

¹ Der Kampf um's Dasein am Himmel. Versuch einer Philosophie der Astronomie. Von Dr. Karl Freiherr du Prel. 1876, pp. 369.

stars, without attaining a steady balance between centripetal and centrifugal forces; while still more, revolving in parabolic or other orbits, were soon crumbled by the great difference of temperature between perihelion and aphelion. Venus, Earth, Mars, Moon, asteroids, meteors, comets, gas, represent the decaying phases of planetary life. Assuming sensation as a fundamental property of matter, he argues that in a universe of perfect harmony the sum of atomic pain is reduced to a minimum; but as every series is sure to be sooner or later, as ours is now, a declining one, so we must face the fact that our world is slowly but surely approaching the "absolute pain of atomic disintegration." Although the physical organization of the inhabitants of other planets may be quite different from our own, we still know through the spectroscope enough of the physical conditions of life upon them to be sure that there, as here, evil and pain preponderate as a general law of nature.

In another large volume, written three or four years ago and published under an assumed name,¹ it is urged that God must be conceived as the primal undifferentiated ground and substance of all things. Not content with even such a negativity, he willed that, instead of his blank and empty being, absolutely nothing should exist. Creation and the world-process is the gradual accomplishment of this divine self-decreed annihilation. Instead of Schopenhauer's will to live, he postulates a *will to die* as the equally universal and immanent agent of all change. In all we do we are unconsciously willing death. The individualization of being, from atoms up to man and human institutions, and the friction

¹ Philosophie der Erlösung. Von Philipp Malländer.

and conflict between these specific forms of existence, are characterized with great detail as the well-chosen and effectual means of this torturing "suicide of the absolute." The author exults that he has no children, and that nature has never seduced him to commit "that act which is the epitome of the world-process." Celibacy is the highest or "absolute duty" for all.

The speculations of Preuss¹ are still more vague and still more ambitious. The primitive condition of things cannot have been rest, he premises with Geiger. Motion, however, does not reveal internal states, which are understood only by sympathy. The world, from atoms up, consists of motions and sensations. Probably even the falling stone feels, although we can have no name or conception for such elementary sensations. If we draw from the ever pure and fresh fountain of self-knowledge, we shall learn that reason and intelligence have grown out of antecedent "soul-states" originally very different from themselves. The ego is composed of painful and disharmonious sensations. The psychic significance of life lies in diminishing the sum of discords between ourselves and nature, as well as between discordant elements in our own souls. Memory fortunately preserves only the pleasures of pacification and rest. At the beginning of the world-era, the sum of disharmonious sensations was relatively great: they are, however, always decreasing; and when they cease the world-process will be at an end. Morality reduces the number of subjective, justice the number of objective, conflicts. The more disharmonies, the more organisms; hence, at first all matter was organized,

¹ Die psychische Bedeutung des Lebens im Universum. Von Wilhelm H. Preuss. 1879.

and at last none will be. The primeval organisms assumed at the beginning to have mediated between the transcendental and the now actual order of things, or the "biologic unities," were probably semi-fluid albuminoids, and perhaps still exist in minimal size as world-mist. From the unknown force by which these moved in free chaotic dances, unaffected even by gravity, which did not yet exist for them, were developed manifold processes, best figured as conflict and secretion, a reciprocal limitation of movement, and a division into organic and inorganic in the modern sense. Life develops higher and higher forms at the surface; and the dross or excrement of life increases in equal proportions at the centre of the earth. Even meteorites are made by collisions of germinal matter, and their surfaces are covered with life, every trace of which is usually burned off in their passage through our atmosphere. Organic and inorganic thus proceeded from chaos together. By the formation of an element of the latter an element of the former was impelled correspondingly higher in the scale of life: thus the less life, the higher it is, and the larger does the chip-pile of dead matter become. The earth was not passing through stages of preparation for plants and animals before they appeared. If the primeval geologic fire had been complete, the earth would have been a cinder on which no germs could have been produced. The full central energy of biologic units is directed from the first to the formation of man. The first anthropogenetic germs were not able in a collision to generate more than a single germ of the higher order; but in the later productive acts of their fatigued state were zoögenetic. Still later they produced only plants; and at last, pro-

creation becoming less exhaustive, each unit was able to produce several units of the same species. The light of the sun may be phosphorescent masses of these units, as yet covering its entire area, and causing the phenomena of heat. Great men, with relatively harmonious natures, are understood by the masses as little as the disharmonious sensations of a block of marble are understood by us. The end of all things may be a sort of involution or "entophy," whence a new world shall emerge, phoenix-like, from the residue of the old. Darwinism is censured for giving no idea of the force behind, which impels development. By perfecting self-knowledge man can know all things; for he is a microcosm as old as the earth. Indeed, he existed with all his faculties in germ "when there was no more than a handful of dead inorganic matter in the earth." This perhaps smacks of meliorism, inasmuch as man can and does, in a certain sense, better his condition. Its author claims to have reconciled pessimism and optimism.

Among the politico-social speculations of pessimism we will notice but two. The first is a pamphlet conspicuous in the window of every book-shop, and which in two or three months has reached a sixth edition.¹ It is written in a racy and extravagant style, "from the standpoint of a resigned pessimism." Since political disabilities were removed from the Jews in 1848, Germany, we are told, has waged a relentless thirty-years' war with her immense Jewish population. The latter have slowly monopolized the fine arts, the more experimental sciences, the larger industries, and at last the German parliament, and more than three-fourths of the

¹ Der Sieg des Judenthums über das Germanenthum; vom nicht confessionellen Standpunkt aus betrachtet. Von W. Marr.

German political press. The secret of Bismarck's successes is that he knows how to play into the hands of Jewish interests. The hostility against Wagner's music is all dictated by Jews, because he represents pure Germanism. Semitic toughness and genius have been too much for the Teutonic spirit. The materialism of public opinion, which is manufactured only in the interests of financial speculation, the dead formality of the recent issueless parliamentary debates upon proposed usury laws, the articles of the Berlin Congress, and the hard times since the war with France, especially the last seven lean years, are all due to Jewish agency and influence. Germany is already subjugated under a foreign yoke. The decomposing mission of the "absolute individualism" of the Hebrew race, who are the "moneyed Internationals" of Western Europe, will end with the helotage of its native population in a sort of occidental New Palestine. Thus, and not by a return to Jerusalem, will prophecy be fulfilled. As the Christians penetrated and at last revolutionized the pagan world, so the Jews are revolutionizing the Christian world after and in return for two thousand years of persecution and dispersion. To the advent of the pure Slavic races the author looks for ultimate deliverance from impending "Jewish Cæsarism."

Another recent though far more respectable and much-read work¹ contains some pessimistic strictures on the United States. America, it is said, is not an illustration of the westward course of empire, but it presents an entirely new line of development, with new problems, new ideals, and new dangers. Our politics, moreover, is of a scarcely higher order than that of South America :

¹ Hellwald's *Cultur-Geschichte*, Bd. II.

party rule has become the rule of "bosses," which are compared with the "tyrants" of Greek history. Corruption, moral, social, and political, is sure to result from the suddenly increased facilities for intercourse, which causes a struggle for survival among the customs, ideals, and convictions of races, localities, etc. Only an ethnically pure people can survive the influences of modern life. This we are least of all nations fitted to do. The stultifying effects of religious superstition, and the disposition to judge of the value of education solely by the advantage it gives in money-getting, and the practice of abortion, are much exaggerated and condemned. The decrease in the ratio of native births, and the preponderance of female infants, it is urged, indicate a stage of national physiological decay; while the position of woman, whether emancipated and on the platform or at the *head* of her own household, is calculated to give a prominence and an authority to the sentimental and personal view of things most prejudicial to rational culture and to progress.

The above views are perhaps all about equally extravagant. Most of the many writers upon the subject consider the condition of the universe far less desperate. Dr. Hartsen (Catholic) and Rev. A. Knauer (Protestant) admit that the world is as depraved and miserable as any pessimist could wish, but only to argue therefrom the certainty of blessedness in a future life; while I. Volkelt, admitting the present truth of pessimism, thinks that in the future happiness will come to preponderate over pain, because, while "experience is pessimistic, reason is optimistic in spite of experience." Dr. L. Weis believes that pain has been in excess in the past, but that now the balance begins to incline slightly towards the side of happiness.

After turning all these dreary pages, we are less able than ever to treat the problem seriously. Indeed, we hardly know whether these writers are in earnest, or whether some of them are not attempting a bit of scientific satire, as, indeed, it is charitable to suppose, it reads so much better that way. We trust these authors may experience in full measure the peculiar satisfaction which minds of a certain fibre feel in having expressed any thing so unique or even false that no one will ever be disposed to question their exclusive and absolute originality or property in it. This sense, no doubt, may go far to console pessimism itself. But more seriously, we cannot decide whether wretchedness preponderates by a show of hands, we are told, for there are many *unconscious* pessimists; nor have we any test of the quality or measure of the quantity of happiness, for if pleasures may be imaginary so may pains. Some of the above theories concern intellectual problems of vast moment; but they do not affect the question whether happiness is to be tediously cultivated as a virtue or an art, or whether it is simply the natural and abounding "sense of life transcending every special form of pleasure." And yet when we find such books as we have characterized marked and dirtied by use in the public libraries, and so eagerly discussed in periodicals and in cultivated society, we are compelled to believe that the deepest and broadest of all possible philosophical problems are gradually taking shape and form, and that a new comprehensive and *popular* answer to the ultimate questions of life and destiny may before long become imperative for the preservation of moral and social order between modern civilization and lawless democracy.

THE NEW "CULTUS" WAR.

My bookseller has collected for me nineteen pamphlets, of all sorts and sizes, on "the Jewish question," all published within a few months, and several of which have reached a fourth or fifth edition. Fourteen thousand copies of the first edition of an address by the court-chaplain, Stöcker, are said to have been sold in a week. Herr Glagau, a member of the Berlin Philosophical Society, has founded an anti-Semitic semi-monthly called *Der Kulturkämpfer*; and Herr Marr, who first started the present agitation against the Jews, has founded a monthly called *Die deutsche Wacht*. An "Anti-Semitic League" has been established, the object of which, as set forth in its statutes, is to restrict the Jews to an amount of influence proportioned to their numbers, to oppose the Jewish press, to resist the election or appointment of Jews to political or other offices, to withhold patronage from them in business, and to "free Germany from the oppression of Jewish influence, social, political, and ecclesiastical." The medical faculties in several universities have resolved to resist the further appointment of Jews to professorships; and at last Professor Treitschke, who has a great fondness for being on the popular side, has entered the lists against the Jews, and writes: "Let us not be deceived: the movement is very deep

and strong. In circles of the highest authority, among men who reject with horror every thought of ecclesiastical intolerance or national pride, one hears to-day, as if uttered by a single voice, 'The Jews are our misfortune.' " Many, in fact most, of the pamphlets before me are ridiculously violent. The Jews are compared with the gypsies, the Chinese or negroes in America, the Catholics, the Jesuits, the Internationals, the Free-masons, shoddy aristocrats, etc. They are called, as were the Christians of old, "the enemies of the human race." Their creed is said to be found on the blank leaf between the Old and New Testaments. Their rule of life is the Talmudic verse which declares that as man among animals, so is the Israelite among men. One writer says they must be expelled from Germany; and a Catholic paper in Silesia, I am told, declares, that, but for the effeminate sentimentality of modern nerves, it would have a good moral effect to burn a few of them. The agitation seems in nearly every feature to be surprisingly mediæval and even inhuman. It bears every mark of an unreasoning race-prejudice, and is disgraceful to the culture of Germany. I will try, however, to epitomize briefly and impartially the chief points in the controversy thus far.

The orthodox Lutherans urge that the daily press owned by Jews satirizes their clergy, conventions, and creed, making common cause with the reddest radicalism, while Christians never feel or express any thing but reverence for the Old Testament or for the worship of Jehovah. They are outraged that a Jewish physician has urged, on purely medical grounds, that circumcision should be general, and that a Paris orator has lately said, "A new Messianic kingdom, a new

Jerusalem, must arise instead of emperor or pope ;" and accuse them of still cherishing the idea of "overcoming and enslaving humanity." The free religious pamphleteers, on the other hand, argue that the Jews are now the same tricky, avaricious egoists that they painted themselves in the Old Testament, and are bound only by the letter, and fear only the penalties, of the law ; and they reproach the Christian Church for not having long since seen the vulgarity of the Old, and clung to the New Testament alone. The first are more outraged by the reformed, the latter by the orthodox, Jews ; while both object that the Jews are allowed to send their teachers of religion to their own children in the public schools two or three hours a week. Another writer urges, that, though possessed of strong and vigorous bodies and admirable vegetative physiques, a very large per cent are found by medical examiners too weak of limb, from generations of sedentary life, to serve their time in the army, and, both as exempts and as being unwilling to fight their own race in armies of other nations, are eminently unpatriotic, and, in short, bad citizens and moneyed internationalists ; while the "Alliance Universelle Israélite," founded in 1860, is described as hostile to patriotism in every country in Europe.

Again, it is said, that partly by introducing cheaper and less durable wares, as in ten-cent and dollar stores, they have destroyed the demand for good and thorough work, injured the retail trade, etc. Moreover, they are charged with being clannish, and always helping and playing into each other's hands. If a German Jew should see a strange French Jew and a German neighbor in distress, and could help but one, it would be the

former, — is repeated over and over again. If a Jew does any thing at all noteworthy, his fellow Jews constitute themselves a mutual-admiration society to over-praise him. Thus, Disraeli; Gambetta; Ebers, the novelist; Heine, who by his flippant way of speaking of the deepest and most serious sentiments introduced a most un-German element into literature; Lasker, who conducted the national liberal party purely in accordance with Jewish interests; and many others, — owe all their fame to the art of mutual laudation. It was the rapacious Jews who destroyed the springs of national life in Poland, causing it to fall so easily. Now they are doing the same thing in Rumania, under the protection of Disraeli's policy, as they will later do in Germany. They get the best seats in the theatre, the best coupés in the cars, are first served in the restaurants — all by bribery; and yet never work, produce nothing whatever that adds to values in the world, but only trade and speculate in the wares which others have produced; and therefore, since they decline all kinds of productive labor, refusing thus to bear the full burdens of citizenship, their rights should be restricted. Finally, the Prussian Minister of Public Works, Maybach, in a public address, denounced the Stock and Produce Exchange itself — a very large per cent of whose members are Jews — as an upas-tree which poisoned national industry far and near; although, in consequence of the great excitement which his remark occasioned, he qualified it somewhat a few days later. On the one hand we are reminded that Marx, Lassalle, and even Nöbiling, were of Jewish descent; and perhaps in the following paragraph are told that next to their worship of the golden calf is the worship

of the Jews for their own race and its traditions, and especially its prophecies. These last, in the scope they are now assuming, will be fulfilled only a few generations hence, when a material civilization shall have gone round the globe to Palestine again, which is best adapted by nature to be an universal emporium, and whence the nations will be ruled by a hegemony of banking satraps and feudal lords. Some socialists now say that the present hard times are due to speculation and accumulation of money in a few hands, and that socialism will never be cured till the people rise *en masse*, and drive out or plunder the Semites.

This will perhaps suffice to show how absurdly extreme and inconsistent are the current attacks. They remind an American of some of the anti-Catholic literature in the old Know-Nothing times. It is not impossible that some fanatic may vamp the old charges of poisoning wells and roasting Christian babies. The Jews, however, have shown that they know how to defend themselves. They urge, and I believe most justly, that they have been made the scapegoat for evils which they have not caused. Business depression has other causes; and the alienation of the community from the Christian faith is the inevitable drift of the age, with which they have nothing in the world to do. It is Christian far more than Jewish prejudice which prevents them from intermarrying and assimilating socially with the communities in which they live. It is the long, sad story of their restriction, oppression, and persecution through the Christian centuries, which accounts for the accident that all their family traditions, from the time when they were forbidden to enter any of the trades, incline them to traffic

and to hold their possessions in movable form. If they are materialistic and self-seeking money-hunters, it is because they follow, not lead, the tendency of the age. They remind us that they number scarcely fifty thousand in Berlin, and but a few thousand more in France or in all Great Britain; that their orthodoxy and radicalism are both less fanatical than that of the Christian sects; that they have always been the "Swiss guard of theism," and that the religious trouble began with Hegel's "veiled atheism," and ended with the Thersitic pessimism of Schopenhauer, neither of whom was a Jew. From Jews came the idea of one God, which superseded German polytheism. They refer with pride to their charities, and to the fact that a far larger per cent of their young men than of Christians are in nearly all the higher institutions of learning in Germany, and compare their good citizenship with the political insubordination of the Catholic subjects of the Kaiser. There is no secret understanding whatever among Jews; and the Paris Alliance was only to aid in freeing and enlightening the Orient, as opposed to the benighted policy of Russia, from whose purer Pan-slavism alone Herr Marr sees possible redemption for Germany. That the Jews are proud of their ancient traditions, and perhaps look upon Europe as young and inexperienced, somewhat as Europeans regard our own country, is, for aught we know, natural and certainly excusable enough. Their spokesmen now exhort them to remember that "Hamans and Marrs," that jealousy of their money, and religious and race hatred, have always assailed them; to "cleave everywhere to the party of liberty and progress which best represents humanity;" and thus to press forward to the accomplishment of all their mysterious destiny.

So far the Jewish side of the controversy has been a dignified, moderate, and rational plea of not guilty, with very little of the extravagance of their accusers, and with almost no attempt at recrimination. Their numbers and influence are doubtless greater than in other large European countries, and no one denies that there are differences in religion and race. Haeckel thinks they spring from a different though by no means inferior species of ape to that from which the Japhetic peoples are descended. They are far the best of all the Semite races; and, in my opinion, both they and we should be nationally benefited by a fusion of blood. One writer, who defends them vigorously in every other respect, concedes at the end of his pamphlet that "Judaism unites realistic optimism with idealistic pessimism, while Christianity conversely is founded on realistic pessimism and idealistic optimism." But is it better to disparage or neglect the present in pursuing distant ideals, or in hope of a transcendent future happiness, than to help a people like the Germans to re-act from the influence of absolute idealism toward a more broad and practical living, as the Jews have done, and to embody the utilitarian ideal of an enlightened even though "centrifugal" selfishness?

FERDINAND LASSALLE.¹

THERE are few living men whose words and deeds have excited such general interest in Germany during the last few years as those of Lassalle, and yet he died in 1864. For the freshest characterization of the principles and issues of socialism, students are everywhere referred to his pages along with those of Marx. He lived the eminently public life of an agitator; and yet not only his motives and the tendency of his theories, but his sincerity, and even his private character, are seriously called in question. Brandes, in a pains-taking monograph, eulogizes him as the great protagonist of unity for the Fatherland and freedom for the people, who "transformed the Germany of Hegel into the Germany of Bismarck," and who sketched the policy of the latter five years before the incorporation of Schleswig-Holstein; while Mehring holds him largely accountable for Social-Democracy, which he thinks is an exotic weed in German soil, and describes him as degenerating from a scientific statesman to an agitator, and finally to a disappointed and lying demagogue.

¹ Ferdinand Lassalle: ein literarisches Charakterbild. Von Georg Brandes. 1877, pp. 266.

Die deutsche Socialdemokratie; ihre Geschichte und ihre Lehre. Von Franz Mehring. 1878, pp. 226.

Meine Beziehungen zu F. Lassalle. Von Hellene von Racowitza, geb. Dönniges. 1879, pp. 188.

When he died at the age of thirty-nine he was pronounced the most brilliant man of his time, and Humboldt is said to have called him the most surprising genius of the century. A few socialistic leaders still compare him in their perorations to Jesus and to Paul. His picture is found in the homes of half the working-men of Leipsic, Hanover, and Berlin, and he has been made the hero of a popular though stupid drama. Professor Wagner has lately edited, with an appreciative introduction, his letters to Rodbertus; and just now a little book has rushed to a third edition in a few weeks, revealing more fully the causes of the duel which resulted in his death.

Lassalle's life is all drama and romance. Born of Jewish parents, endowed with a foppish taste and a domineering spirit, a friend of the poet Heine, who addressed him as his brother-in-arms, and writes to him, "In comparison with you I am nothing but a modest fly," he first attempted to open an academic career for himself by a critical elucidation of Heraclitus, which still remains the best work on the subject. He was attracted to this philosopher because his vagueness challenged his ambition, because he seemed to him to furnish the key to Hegel, and because in the man who "banished rest from the world" he found or fancied much that was akin to his own stormy soul. At the age of twenty-one he met the Countess Hatzfeld, a somewhat strong-minded but more abused woman, twice his age, who had for years quarrelled with and vainly sought divorce from her outrageous husband. With characteristic ardor and energy he threw every thing aside, and espoused her cause before the courts. He studied, and was admitted to the bar in six months,

and carried her case from one tribunal to another for eight years and through thirty-six trials, suffering all sorts of obloquy from friends, and persecution and even imprisonment from the party of the wealthy count, till at last she was divorced with a handsome settlement. This, he declared, was the event of his life of which he was most proud. He had come to see in her individual lot "the purest microcosm of all social misery and oppression." It will now, however, hardly be questioned that this experience gave a wrong direction to his whole life and character, and that, constantly attending and influencing him as she did to his death, whatever their personal relations (a question of ceaseless interest to the prurient), she became really his bad angel.

He next essayed dramatic authorship. In his "Franz von Sickingen" he attempted to illustrate that the drama, as "the highest form of commending any given subject-matter," as Humboldt had called it, might represent the conflicting principles which determine the fate of nations, and not merely, as heretofore, that of individuals. Lassalle's own character, in its constant oscillation between personal and ideal aims, is nowhere so fully and frankly portrayed as in the character of the central figure, *Ulrich von Hutten*; but in every detail of form the piece is indescribably deficient.

His chief work, which no student of political science can afford to neglect,¹ is an excellent illustration of the oft-quoted remark, that it is impossible to approach modern political philosophy without getting a touch of Jacobinism; yet he never attempted to draw the practical consequence of the radical theories of this work.

¹ *System des erworbenen Rechts*, 2 vols., 1861.

He argues with vast erudition that property, and more especially the modern institution of bequest, is not a logical but an historical category. The Roman testament bequeaths the will rather than the property of the legator; and the heir is primarily to *act*, and only secondarily to have. It was an attempt to preserve a personal and mundane immortality for the ancestors whose ashes were buried, and whose manes still dwelt with the family. But, if the soul in no sense survives, then the Roman will has no validity; if it does, then Adam, or the first legator, is the only owner. According to the old Germanic conception, on the other hand, the family is the possessor. The ownership of the heir begins with the begetting of him, and is not essentially confirmed by the death of the parent. With advancing freedom the idea of absolute ownership was developed, and property came to be regarded as individual. Thus exclusive ownership is not a natural but an historical or acquired right. The foundation of all right, Lassalle continues, is might, much as we may wish the reverse to be true. Thus every revolution creates new rights, which are only "*new consensus*." Positive and natural rights, however, are reconciled by the fact that the *Volksgeist* thinks far more profoundly and consequently than the individual. Thus no age or race can judge or should be judged by another. Every law which affects the individual only by organically changing society itself may re-act, since by general consent men may be dispossessed of merely acquired rights without legal processes and without indemnification. Property must be acquired through conformity to the existing constitution of political and social life. Hence, and in so far as this latter changes and assumes

new forms, the right of private possession may be modified, even to the extent of an expropriation of all property, provided always that the consensus is general; while testamentary power is only the arbitrary disposition by society of one of the many charges left to its care, and the modern notion of it is a grand misconception. Even on his own soil the individual cannot say, Here I am sovereign; for his every contract implies as its condition that the laws remain unchanged. Machines, stock companies, public works, etc., set more and more objects out of the sphere of private property, which modern culture and progress are ever limiting. A more perfect and detailed philosophy of right shows us a more purified income — property proportionate to service.

This and Marx's well-known work on "Capital," which bases all classes of society and all institutions, legal, political, and religious, upon economic relations as creations of productions and exchange, are the most scientific of all German socialistic works, and mainly constitute the basis of the *Kathedersocialism* of the universities, which, as represented by Wagner, Conrad, and Treitschke, is infinitely removed from that of Becker, who styled himself the President of Humanity, or of Düring, who, forgetting the almost Hegelian *horror pleni* of most socialistic apostles of the future, has, with great minuteness, detailed the coming socialistic state, wherein even genius and talent shall be voted no condemnation, but be paid in work-tickets of enhanced value.

Lassalle's many other shorter writings are far less scientific. He argued for general suffrage, for state credit, for productive associations; for the unification

of the Fatherland by arms if need be, but on a democratic instead of on a dynastic basis ; for the economic emancipation of the workingmen from the iron law of competition for wages, from which he declared ninety per cent of the population of Germany were suffering. He tells the workingmen that all forms of capital originate in their ten fingers ; that the great industrial centres are the germs of the future state, in which the capitalistic shall be superseded by the socialistic method of production, and that all progress comes from a clearer idea of the state. But he hated his own Semitic race, made war upon the press, appeared in ball costume to address the workingmen, courted arrests, and made elaborate harangues in his defence, and, above all, failed to distinguish, as every one who aspires to political influence must constantly do, between exoteric and esoteric reasons and motives. He predicted that one hundred thousand workingmen would join his association, and contribute yearly one hundred and fifty thousand dollars ; but scarce five thousand actually enrolled themselves. He was fretted by delinquent payments, by quarrels and misunderstandings. The fool and the wise, he exclaims, can be influenced, but the half-cultured can be neither forced nor led by gods or men. "If my reform is not ripe, I am a lost soul," he writes. He hoped the party of progress would affiliate itself with him, and then that Bismarck would make terms with the leader of the fourth estate, and he also predicted a re-action ; but nothing of the sort occurred. He had quarrelled with Marx, and had still less in common with Schulze-Delitzsch. He grew domineering, and would rule alone : his character became all color and form as his cause grew desperate.

It was at this point in his life that he met Fräulein von Donniges, daughter of the Bavarian envoy of Bern, at an evening party. Both loved on the instant, and an engagement was assumed from that hour. The girl's father hated Lassalle, and, when arguments were unavailing, cursed and disowned his daughter. She no less passionately gathered her jewels, went late in the evening to Lassalle's hotel, telling him they must fly and be married on the instant or never. The man, who never scrupled before, now hesitated and finally lectured her severely; said he would compel her parents to consent, and brought her home, where she was locked up in solitude, scolded and half-starved into writing, and then declaring before witnesses, that her love for Lassalle was dead. He, meanwhile, was writing to the bishop and supposed confessor of the girl, and inducing her father's superior to threaten him with loss of position, etc., to gain his consent. The affair had already in part become public when her letter and message arrived. His pride was so wounded by the ridicule of his enemies, that, in a fit of desperation, he challenged her father, and was shot in a duel by his rival. The girl married his antagonist, and only now, long after the latter's death, reveals the whole of the melodramatic story, declaring that her love for Lassalle never wavered. Strangely enough, a Russian lady had shortly before published "a love episode in Lassalle's life," of which she was the heroine, with a series of ardent letters from him, written to her during the same two last years of his life, the authenticity of which is vainly disputed by his apologists.

Among the many views lately taken of his many-sided character, we concur with those who make per-

sonal ambition his leading motive. He could love any woman who passionately admired him, espouse any cause which he could lead, contend against the most formidable odds if the contest brought him *éclat*, attempt literary tasks for which he had not the slightest aptitude, to win the repute of versatility; born aristocratic though he was, he could work for and among the masses whom he loathed, because he hoped as their leader to win consideration and position among the political chiefs of the day, and even do the severest scientific work if the applause of the learned world was tolerably certain. But some good he has done; and in the mythic halo which already encircles him in the popular imagination his figure is now, since worse leaders have succeeded him, as beneficent as it is unique.

THE GRAPHIC METHOD.

THE origin and nature of our knowledge of motion has become a question of the first importance for philosophers of all schools. According to Trendelenburg, logic requires us to make movement the ultimate explanation of all things. From the standpoint of evolution, Spencer argues that there is a direct and universal relation between quantity and heterogeneity of motion and the degree of development of nervous centres. Even according to Haeckel, soul-life, whatever be its nature, seems to begin at least as low down as in contractile tissue. Vierordt holds that psychologically motion is not a perception but an immediate sensation, and that thus the muscle-sense is absolutely unique, in that the incommensurability between the objective thing and the subjective knowledge of it, found in each of the five old-fashioned senses, does not exist here. From the standpoint of the theory of knowledge (*Erkenntnistheorie*) Helmholtz argues that sensations are nothing but guides for movements, and that, apart from the practical use we can make of a thing, all other conceptions of it are as impossible as the blind man's notion that sounds are colored. The same drift may be seen in Wundt, Exner, and others. Partly influenced by such conceptions, and partly by the intrinsic richness and suggestiveness of the field, myology is now consid-

ered by many as a branch of psychology scarcely less important than the study of the senses, connected as it generally is, through the doctrine of apperception, with the study of the will itself, and throwing light on its education, its nature, and its freedom.

It is in this connection, in recording movement as a function of life, that the graphic method so well described in epitome by Marey¹ has achieved its greatest triumphs. Every one knows how apprehensible and compendious statistics of all sorts — winds, produce, the business of railroad lines, electric tension, temperature, national debt and credit, insurance probabilities, etc. — may be made by representing them as the product of two variables laid off as right-angle coordinates, each as function of the other, with curves tracing their relation on a surface (for example, age and death-rate), or adding the representation of a third dimension by colors or shades, as census-tables of population, altitude, etc., — a method which Quetelet has introduced into political and anthropological science with such interest and success. The results of long and tedious investigations, such as the direction of aërolites; the periodic tides of lakes; the sensibility of the different zones of the retina to different colors; the trajectory of a balloon; the relative growth of the different sexes in childhood; the solubility of different salts at different temperatures; weight and cost of bridges of different materials; the growth of different plants under different chemical, thermal, and luminous conditions; phases of the solar spots; the elasticity of nerves, etc., — may thus all be comprehended at a

¹ *La Méthode Graphique dans les Sciences Expérimentales.* Par E. J. Marey, Paris. 1878.

glance even by a tolerably inexperienced eye. It is superior to all other modes of describing many phenomena. Language was born before science, and even its technicalities are often ambiguous. The senses, too, are often deceived. The persistence of after-images produces confusion in the eye, to which latter the whole science of astronomy gives the lie. But the graphic method is fast becoming the international language of science, remarkably accurate in seizing subtle shades of change, and adapted equally to investigation and to didactic purposes. In Germany, where it is most developed, it has revolutionized certain sciences by its unique logical method, and in one or two cases at least has converted the lecture-room into a sort of theatre, where graphic charts are the scenery, changed daily with the theme, and where the lecturer is mainly occupied in describing his curves and instruments, and signalling assistants, who darken the room, explode gases, throw electric lights or sunbeams, simple or colored, upon mirrors or lenses, or strike up harmonic overtones, as the case may be.

As a microscope of time and space this method has achieved its most remarkable triumphs. By a mirror mounted on a syren, and rotating in a sunbeam with a rapidity determined by the pitch, the ten-thousandth part of a second may be easily and accurately measured, and thus the horizontal line on which time-measurements are laid off may be divided to represent, if necessary, even these small durations. By a method which he does not reveal, Nobert has succeeded in dividing a millimetre, or about the one twenty-fifth of an inch, into thirty-five hundred equal parts, each somewhat smaller than a powerful microscope enables one

to perceive. Each of these can be laid off on a perpendicular line at right angles to the first, and their concomitant variations can be traced by a curve. Although capable of such minuteness for tracing out a "cosmos in the microcosm," it need scarcely be said that every inch may just as well represent millions of years or miles as infinitesimals. Armed with this method, it has been recently proved that the quickest and slightest motion of the finger which a pianist can make, is not a simple but a compound and prolonged act of the will; each of the six different gaits of a horse may be minutely described in as many different lines; the frequency and exact direction of the motion of the wing of a flying insect may be traced directly upon smoked glass, and if required, according to the practice of some popular lecturers, shown the next minute to an audience, magnified upon the screen of a magic-lantern; the one-tenth of a second intervening between an impression upon one of the senses and the quickest possible re-action (known as the personal equation) may be analyzed, as by Donders, and apportioned, in its twelve distinct elements, among sensory organs, ganglion-cells, nerve-tracts, latent muscular time, etc., the action of each occupying its own fixed fraction of a second. By immersing the hand in a closed cylinder of water ending in a small perpendicular tube, on which floats a pen that writes on a revolving drum, not only is every heart-beat shown to swell the hand appreciably, but even fear, anxiety, hunger, different drugs, pressures, etc., all record their own characteristic forms of pulse-curves.

But it is not my object — indeed, it would require far more space than you would allow me — even to name

the achievements of this method; nor do I care here to urge its more extended use in schools, by the daily press, etc., as is often done in Germany. I would rather raise an ulterior, and even in some respects, perhaps, premature, question as to its capabilities, and the sort of value attaching to it. First, though it *may* be possible to reduce the syllogistic logic to graphic symbols and equations, we are not yet able to believe that thought will ever find here an adequate general vehicle for its inscription, which will supersede the old Cadmic method, as an enthusiastic young professor here has lately argued, any more than Aryan myths will be better told in the purely hypothetical old Aryan tongue. Words may be recorded in phonographic type, or in overtone series on a musical bar, as by Helmholtz, or in lip curves, as by Brücke, or in symbols of the position of the organs of speech, as by Graham Bell, etc., but the alphabetic method will no more be superseded than words themselves will be resolved into more radical expressions of psychologic tension. This, almost as a matter of course, I think. Again, I cannot believe that psychological phenomena will be ever to any great extent reproduced from any combination of the various curves they trace, as sound is reproduced from the curves inscribed in the tin-foil of a phonograph; yet even this is sometimes strongly urged. Once more, it is chiefly argued that the movements are absolutely regular and constant under the same conditions. This idea has stimulated very many to study the methods of analytical geometry, and has done much, directly and indirectly, to develop the application of mathematics to curves of all sorts of co-ordinates. Whether this can ever be done for organic,

as it is for inorganic, structure and forces, is perhaps the most modern phase of the old question between mechanism and teleology, which I have no wish to discuss, and which may not, indeed, reach the discussable stage for many decades. Not that I am without impressions and prejudices enough, but because it seems to me one of the questions respecting which it is most philosophic to cultivate equanimity in suspense. On the one hand, the near and constant approximation to exact proportions, and on the other, the invariability of the residual deviation, are equally surprising. While the equations for the curvature of the cornea, the rotation of the eyeball, the superposition of muscular and sensory irritation, etc., are pretty well developed, there is no single cornea, eyeball, or muscle curve, and no measured and averaged series of such, that gives the precise curve; and thus the latter remains like the ideal head or arm which sculpture can create, but nature, so far as observed, has not created. Hence, it is said by some that the conditions of observation are not fully controlled. This the complexity of every thing organic makes extremely plausible. Others assert that the statistics must be universal, before the perfect mechanical cosmos is unveiled. This is certainly beyond the present reach of contradiction.

One of the impressions of Theophrastus Such is, that as the sum of human knowledge is reduced to motion in time and space, and as it becomes possible to conceive of self-reproducing machines which can give readings for the whirl of molecules engaged in composing an epic, etc., consciousness will become extinct, since molecular combinations will persist as the most fitting survivals; in a word, all will be action,

while knowledge, and even sensation, will be superseded. I instance this as a purely theoretic fallacy quite current among scientific laymen. It is logically and psychologically wrong. Both the tendencies and disciples of every theory of the unconscious are mystic and strongly teleological. Again, mechanized knowledge is now simply the most organized and *known* form of knowledge. Hypothetical mechanism is often merely the best and most serviceable sort of *memoria technica*, and is quite consistent with the philosophical faith that all mechanism is a form of knowing, now very practical but perhaps transient, and in no sense a *Ding an sich*. As science advances in the study of consciousness, its highest problem, it will perhaps find it no less serviceable to resolve all knowledge into the forms of self-knowledge, interpret force as will, etc. ; and its ideal future, if it trouble itself to note its own dreams, may be rather more like the Hegelian millenium of all-consciousness, than the actualization of a universal self-mending, self-governing, self-reproducing, self-knowing machine.

THE LEIPZIG "MESSE."

IN spite of all that has been so long said and sung about the Fatherland, German patriotism has still a very provincial aspect, of which much less has been heard. Munich, Dresden, Hanover, Berlin, and, in fact, most of the larger and older capitals, are yet popularly represented by distinct types of character — or rather of disposition — universally recognized, and, indeed, cultivated with no little complacency. No type, however, is more marked than that of the *gemüthliche Sachsen*; and no one is fonder or prouder of his city, dialect, folk-festivals, ancient customs, etc., than the average inhabitant of Leipzig. It has been half-humorously known all over Germany for half a century as the little (*klee*) Paris. Since its population reached one hundred thousand, about 1870, it is designated as a *Gross-stadt*; and as its inhabitants are descended from very varied nationalities, and its institutions attract a great number of foreigners, it is quite cosmopolitan, or a *Weltstadt*. It is, moreover, pre-eminently a *Cultur-stadt*, or "the German Athens." Yet it is a rather dirty, unhealthy city, with an atmosphere full of dust and smoke, and with only surface-drainage for many of its streets. It fills but a small space in the guide-books, and is uninviting and for the most part unknown to the general traveller. Perhaps no city is less

adapted to be "done" in a few days by tourists, as Dresden, for example, which is all on the surface, may so well be.

On the other hand, Leipzig is the centre of the German book-trade, with nearly fifty printing-houses, over two hundred bookstores, and a unique booksellers' exchange. It was the home of Bach, and here his music is best performed. It is the stronghold of Wagnerism; and the great *maestro* himself, more than once, has personally directed the production of his Nibelungen trilogy here. The new and magnificently equipped opera-house, the Conservatory of Music, the famous Gewandhaus concerts, etc., altogether make Leipzig — if the verdict of its inhabitants is impartial — the musical capital of the world. Homœopathy and the German scientific agriculture originated here, and are commemorated by monuments of Hahnemann and Thaer. Its university had last semester about four thousand students, and it is rivalled only by that of Berlin. There are certain streets and restaurants where, I have been told, every other man was a professor, an author, or a critic more or less known to fame. Leipzig is in a peculiar sense the *cunabula* of German socialism and spiritualism. The fiery little Bebel, when he is neither in the Reichstag nor in prison, has always been ready to leave his lathe, don his coat, and talk earnestly by the hour to any interested visitor about the injustice of the Government to the cause he represents. Leibknecht also lives here, and collects abuses, edits his paper, and pushes his propaganda as far as circumstances and the laws permit, and declares in confidence that nothing could be better calculated to unite and discipline socialists, gain them sympathy

among the cultured classes, and teach them to lay deep and broad foundations for remote ends, than the removal of the repressive laws he opposed so vigorously in the Reichstag. Spiritualism is extensively cultivated here in private social circles, especially in families of comfortable business men. Reichenbach prepared the soil, and now a spiritualistic periodical (*Psychische Studien*) is published here.

Meanwhile business has developed a friendly competition with culture, and pressed art and literature to an unusual extent into its service. The history of great firms, descriptions of all sorts of technical processes, and monuments to signalize great financial enterprises, have been admirably finished. The greatest of the annual *Messen*, or fairs, lasting four weeks, closed yesterday, and attracted over fifty thousand visitors the first day. These, while fostered by some, are, again, in the liveliest competition with other business interests. Every country in Europe is represented, and a few traders from Smyrna and Tunis are reported. The town puts on a holiday appearance. Every theatre and concert-hall increases its attractions. Hotels double their prices, and excursion-trains run in all directions at reduced rates. Very many poor students take good rooms at very moderate terms on condition of sleeping in an attic or a hall during the fair, while their places are taken by strangers who are charged high prices. The criminal class is numerous represented among the visitors; and the number of police, post-office, and freight officials is nearly doubled.

In the eleventh century, tradespeople who came from the environs to attend the masses at Easter and Michaelmas took occasion to offer their wares for sale

at the close of divine service in the market near by. Soon after, the town decreed that all goods, which, in being despatched from one place to another, had to traverse the great public turnpikes within a radius of sixty miles must be brought to Leipzig, and exposed for sale there for at least three days. This prerogative — *Stapelrecht* — was repeatedly confirmed to Leipzig by emperors and popes. September and April became very conveniently the great market months. Protestantism eliminated the mass, and war and pestilence and the influence of hard times, or rival markets, now mostly extinct, have repeatedly depressed or interrupted the *Messen*; but the construction of railroads has given them new life. Preparations are begun weeks beforehand. The city has farmed out to a few agents the right to erect and rent the booths. These are little shanties of from perhaps six to fifteen feet square, made of boards nailed together, a whole side sometimes in a single piece, so that half a dozen can be loaded on to a wagon. In this way they are put up and taken down, and packed in the storehouses, with great rapidity. Between eight and nine hundred of them were occupied last month. The large public squares are covered with them, and every court and passage all over the centre of the town is filled with goods and boxes. First comes the wholesale leather market, in which much haggling about the weather is always heard, as a moist air increases the weight of dry-tanned hides. Then cloth, which used to be exhibited in the *Gewandhaus* (as its name indicates), has its turn. Porcelain, glass, and earthenware traffic lasts longer. The fur-trade in a single market-week, I am told, has sometimes amounted to several million marks; and its

storehouses occupy a great part of what was once the Jewish quarter. The common pottery-wares, so indispensable in every German kitchen, are exhibited in scores of cords over more than half an acre of ground. My hand has almost ached for a stone in passing these at night, and I fear the temptation would be too great for most American boys to resist. Here, however, they lie unprotected in the open air a month without injury. Many bushels of earthen dolls as big as my little finger lie on the ground in a dozen muddy piles. Much smaller stocks of marbles and scores of booths devoted to toys, which children of the poorest German parents are sure to have in such abundance, make a perfect boys' and girls' paradise.

In the retail booths, where trade lasts longer, almost every thing can be found. A house could be decently furnished, from kitchen and bedroom to library and parlor. Seeds, tools, scientific instruments, every sort of garment or ornament, confectionery, silk, and iron wares, can all be bought at very reasonable rates. Most of these booths are kept by women, who importune each passer to buy. One quarter is set apart for side-shows of all sorts; and near by hot sausages, cheese, fish, and beer, — each of a dozen different species, the fine points of distinction between which are so familiar to the native palate, — are sold. In the book-market all the latest publications are offered for sale at very moderate rates. The wool-market opens later. That I have never seen; but, judging from the preparations long since begun, it will be a great affair.

The struggle between the retail and wholesale manufacturers and trade, which has now become so active a "*cultus*" question here, can be admirably studied at

the *Messe*. The small *Dorf* manufacturer of shoes, rifles, thermometers, oil-cloths, stockings, etc., realizing keenly that he has to compete with machines, generally feels that he can secure his livelihood in the future only by doing good, honest work, devising original patterns, and by persisting in meeting his customers face to face, instead of selling to a third, intermediate party. Accordingly he comes up to the market twice a year, at much loss of time, and hires his old booth in the old place, probably at an exorbitant rate. I know an old mechanic whose work is about perfect, and who is so conscientious and painstaking that he can trust no assistant or apprentice with any important part, although he has orders in advance for far more than he can do at almost triple the ordinary rates. He has been offered a large sum to allow his business to be extended under his name and supervision, but cannot bring himself to do so, because he fears the work would not be as thoroughly done as he wishes. Another, a glass-blower, who, like the late Herr Geiseler of Bonn, has already made science his debtor by the thoroughness and ingenuity with which he has more than filled the orders of a few professional patrons, persistently refuses far more tempting offers to work for the trade. I would by no means assert that such men are the rule; but they are very often found, and have given a programme to the large party of small makers and sellers here. In some respects their position is, perhaps, analogous to that of the best old farming families still found in a few New-England communities, but they are far more numerous. According to a recent reviewer, this class puts both art and conscience into business, and is the germ from which the future state will grow,

while the socialists accuse the Government of adopting a policy in the new tax-laws which is likely to exterminate this party of business regeneration. The issue must, at any rate, be awaited with great interest.

A POMERANIAN WATERING-PLACE.

THIS little Pomeranian settlement (Ahlbeck) near the great harbor of Swinemünde has now become, with the adjoining Herringsdorf, the fashionable seaside resort for well-to-do Berliners. During a visit of nearly a month, we have heard scarcely a word of English, or seen an English or American name in the hotel-register or in the published visitors' list. There are crowds of rest and pleasure seekers; but no games, no races, no rowing, and almost no society, in the sense of American watering-places. The summer and early fall are divided into four "seasons," of from three to six weeks each; and the houses — mostly owned by a few large stock-companies — are rented in flats or suites already furnished, even to kitchen-utensils, to families, or more commonly *parties* of families, who take them invariably by the season, make few acquaintances outside their own party, and live immensely at their ease. There are big out-of-door beer-gardens, and concerts or theatrical performances in the large hotels daily; bathing, mainly by children or invalids; meals five times a day, commonly in large open porches built for the purpose, where many a *Geheimrath*, member of the Reichstag, or general may be seen from the promenades with his family and friends.

These things, however, interest the stranger far less

than the scenery and native inhabitants and institutions of the place. Beech and oak covered hills, reminding one of a New-England village, heavy pine forests, and a wonderful sandy beach, give a strange variety. Half a mile back of the hilly ridge which skirts the sea, lie immense fertile meadows of ten thousand acres, from which the sea was pumped in thirty months, twelve years ago, by wind and steam power, and the moisture of which is now controlled by a simple system of self-regulating canals and windmills. Around it to the north and east are the Pomeranian forests, in which deer, wild boars, and occasionally moose are hunted. The forester has an acre cleared and replanted every year, and the wood sold at auction to the fishermen at a very low price. In spite of this precaution, however, trees are silently sawed down and stolen nearly every night in winter by those too poor to buy; and his too strict predecessor was lately murdered by a trespassing party which he discovered; while a strand officer who attempted to enforce the laws against *hauen* for eels — a method by which all fish within reach of the too-fatal instrument are destroyed without being secured — was taken from his house by masked men, and drowned with an anchor about his neck. Every storm from the north or east throws the now very common amber upon the strand; and the fishermen occasionally bring it up in their nets. It is farmed out by the Government to a Jewish company, to whom all that is found must be sold at a fixed price, unless the finder makes oath that he intends to keep it himself. The fishermen insist that it is not the resin, but the decayed and petrified wood of antediluvian trees of extinct species.

This is, moreover, the *locus* of several interesting

myths which German poetry and romance have made famous. A mile out at sea stood the once famous city of pirates and freebooters, Vineta, wealthy and magnificent beyond imagination, submerged by the gods for its pride, and now occasionally seen in calm weather by fated souls, who are sure to be drawn by the charm of the vision beneath the waves. Near my window, in a deep ravine, was the home and treasure-house of the pirate chief of the Vitalians, Störtebeck, who, in the rôle of the awful black man, is still the terror of the German nursery. "The friend of God, and the foe of all men," he preyed long and successfully upon the commerce of the Hanseatic League, till he was at last captured, early in the fifteenth century. After his head was struck off, he rose, and ran past fourteen of his condemned followers before he fell, thus saving their lives, according to the sworn promise of his judges. A boulder on the strand confines the Amber Maiden in her subterranean chamber of the dwarfs; whence she briefly re-appears every hundred years, and where she still awaits her deliverer.

There are no tides in the Baltic; but a brisk wind changes the sea-level several feet, and a great storm like that of 1872 more than twenty-five feet. It is relatively very shallow. Its surface is somewhat higher than that of the North Sea; and its waters, fed by more than two hundred and fifty streams, are warmer, and consequently less salt, than those of the North Sea. All its harbors are artificial, and located at river-mouths. Its level is gradually rising in the north, and sinking in the south, from geological causes; and zoölogists enumerate here about one hundred species of fish, more than a dozen of which are well known in the

market. During four or five of the coldest months the East Sea is ice-bound, and sometimes frozen over for miles from the mainland. Every storm changes the bottom, and wrecks are very frequent. During the last twenty-five years, nearly a quarter of the male fishing population of this place has been drowned.

We began our study of the inhabitants by a visit to the village school, where the shady side of the German school-system may be seen. There is but one teacher, who has been at his post forty-eight years, and has now two hundred and thirty children under his care. He lives in the reed-thatched schoolhouse, and until recently was obliged to eke out a living for his family by working in the harvest-field. He is a pietist, and teaches his pupils to sing Sankey's melodies while he plays a two-stringed violin. The children have few, often no school-books, and the instruction is almost purely oral. They are trained in the three R's, learn a little geography, and are taught to revere God and the Kaiser. At fourteen the boys go into the boats, and the girls learn to dress fish, gather fagots, harvest, cook, weave nets, etc. There is a town library of forty volumes, although many inhabitants scarcely see a book after leaving school. We listened the other day to an animated discussion by a dozen fishermen, whether the world went round the sun, or *vice versa*, — a question on which opinion was about equally divided. The people are remarkably sober, industrious, honest, moral, and contented, and without exception Protestants. With a population of nearly one thousand souls, there is no church, and the burial-service is conducted by the schoolmaster. Many of the more prosperous have built neat cottages, which are rented to summer

visitors. Their owners are sometimes thrifty enough, not merely to remember in the bills of their guests the ordinary extra items for boots, candles, *Trinkgeld*, mustard, beer that was never drunk, etc. ; but soap and feather beds, every bath taken in the sea, notification at the police-office, all contribute their mite to charges which, after all, are astonishingly small. The fisher himself lives in a substantial house built on the sand, of drift-wood and brick, covered with mortar, and thatch-roofed ; sleeps on a mattress of sea-grass, under a bed of the feathers of wild ducks caught in fish-nets often fifty feet under water. His diet is of fish, and pork fattened on fish, of potatoes grown in sand fertilized by fish-guano that he has made himself, and with sea-tang ; and in winter he must often borrow money at usurious rates from the well-to-do owners of the smoke-houses, who get the lion's share of the profits of his business.

The sea has a rationalizing influence, and the fisherman is far less superstitious than the *Bauer*, or peasant. He is brought into closer contact with a greater variety of natural phenomena, and more disciplined in reasoning from cause to effect. We have heard the inhabitants here discuss, with a degree of intelligence for which it is difficult to account, not only such questions as why fish are more palatable if smoked with oak than with other species of wood, the merits of different sorts of nets, and of different methods of drying, weaving, and preserving them, the marvellous properties of dolphin-oil, etc. ; but why the sea draws showers over to itself from the land ; why lightning prefers to strike in the sea-water rather than in the sand ; the cause of water-spouts and whirlwinds so often occurring here-

abouts ; the right of the Government to levy a tax on the sea-fisheries ; the partitioning-off of the Baltic between the various nationalities which now have equal rights on all its water ; the evils of the new suffrage law, under which every apprentice and employee, without being bribed, must vote the ticket his superior puts into his hand ; the propriety of paying the count, who owns all the land save a few small building-lots he has lately consented to sell, for masts, drying-poles, and fagots, in days' work, as at present, rather than in money, as proposed. The three years of military service, and the campaigns in which they have served, supply the place of an university education to men of this class. It is a part of their patriotism to bring out their best beer, and charge their smallest price, for their own townsmen or countrymen ; and they are fond of boasting how poorly they have served and how much they have overcharged strangers, and especially foreigners. Fishermen here regard peasants with ineffable contempt, as stupid and fit only for woman's work, such as harvesting, digging potatoes on their knees, carrying and cutting wood, etc. Finally, they are not without a saving touch of rough humor. A drunken fisher, nicknamed *Bleistift* from his lead-tipped wooden leg, had quarrelled with his brother while on the sea, who steered to the shore and left him to push off in the boat alone, a few days ago. In a sudden flaw the boat was upset ; and, heavily ballasted as it was with stones, it sunk at once, and *Bleistift* was drowned on the fishing ground. The next night, as a group of fishermen were drinking beer and eating fresh flounders at the village inn, one pushed back his plate, and said solemnly to the dead man's partner, "This flounder tastes of Heyne's schnapps : your brother sends you greeting."

Such a people make the best subjects for a government like that of Germany that we have ever seen, or, in fact, that we can conceive of. They are not educated above their station, have no consuming ambitions and no subversive ideals, are reverential almost to an inconvenient degree to visitors, officers, etc., and are, in repeated instances, stupidly duped by Government subalterns, who are left both to interpret and administer the laws, which only they have read to the advantage of their own pockets. Refuge from a year of jaded city life among such a people, in a cleanly and simple fisher-cot as is here the custom, is so refreshing to body and soul, that one is sure to ask himself if, after all, absolutism, and even obscurantism, may not be here the most sane and moral of administrative policies.

EMPEROR WILHELM'S RETURN.

AFTER an absence of more than four months, the Kaiser returned yesterday¹ to Berlin, and formally resumed the imperial authority, which in the interim had been in the hands of the Crown Prince. The former had expressly requested that there be no military display, and that the total cost of the civic ovation be no greater than when he returned from France with the army in 1871. Despite the hard times, however, the latter request was disregarded; and it is estimated that more than a quarter of a million marks were expended in festoons, banners, cartoons, gas-jets, candles, etc. Many places of business were closed; a holiday was decreed for the University and all the schools; and students, with more than a score of citizens' clubs and societies of veteran soldiers, with banners and music, marched in procession to their positions as *Spalier*- (or fence-) guard, in front of the iron rail which encloses the central portion of the five-fold street, Unter den Linden. This portion was kept clear for the imperial carriages; while on either side a dense mass of men, women, and children waited in quiet expectation for several hours. At length, at one P.M., the Emperor and Empress, seated side by side in a plain open carriage, bowing right and left, and saluting the American

¹ Dec. 5, 1878.

flag, under which nearly fifty American students had been gathered, were driven along so rapidly that the crowd had hardly time to cheer, the bells to ring, or the bands to begin to play, before they were past. The Crown Prince with his family, Von Moltke, and a few ministers and other notables followed; nothing more. The general feeling of relief from a great but unnamed fear was visible on every face, and found expression in countless ways when the Emperor was safely in his palace. Though every precaution had been taken; though the fanatical Fritzsche and nearly fifty other Social-Democrats whom the Government believed to be sincerely in earnest in their opinions, had been banished from the city limits under the new laws; and though a general police inquisition, not only of the passports but in some cases of the private life, of suspicious foreigners, had been made; and though Madai is said to have overworked his whole immense force of secret and of uniformed police, — it was never forgotten that some crazed enthusiast, or the victim of a lot cast in some undetected treasonable society, might be willing to sacrifice himself on so great an occasion. In spite of fears and predictions to the contrary, however, the policy of forcible repression seems now to have reached a successful culmination. Up to the present date about one hundred and fifty socialistic societies and forty periodicals and one hundred and thirty-five non-periodical publications have been suppressed under the recent laws. It is said that the Crown Prince believes still more firmly in the policy of repression, although it is generally admitted that during his brief administration the laws were executed strictly in accordance with the spirit and unexpressed wishes of his royal father.

Of course much, not only of the official, but of the private ostentation on such an occasion is simply business. Enterprising firms vie with each other in the taste with which their buildings are decorated, or in the brilliancy of their illuminations, which are all chronicled in great detail by the ordinarily dull and unenterprising Berlin newspapers. Yet no one at such a time can for a moment doubt the depth and sincerity of the national patriotism, and of the personal love and reverence for the Kaiser, which allies itself so readily at every point with religious sentiments, as may be seen in the mottoes on the street, and in the crowds which will attend the church-services to be held on Sunday in thanksgiving for the Emperor's recovery and return. A large tobacco-firm displayed an elaborate transparency with the words, "Despite tobacco-tax and monopolies, we dearly love our monarch." All parties—even the Catholic Church, by illuminations and a *Te Deum*—joined in the festivities. Some of the more conspicuous of the former we noted down, viz. :—

"May each of the million and a half candle-flames in the windows of his subjects to-night be a blessing realized upon the head of our dear Emperor William I." "All these outward festivities do not express the joy of our hearts, nor the deep pious love of the people for their brave monarch, who has looked death in the face on many a battle-field, and who has watched in pain for us while we were sleeping." "This is a day of glad tidings." "Those who wait on the Lord shall renew their strength." "Let all men now praise the Lord." "The first citizen of the kingdom, the father of his people, the strong fortress of Germany." "Hail to him whom God has preserved! may he preserve thy going in and thy coming out!"

In a brief address at the depot on his arrival, the Emperor declared, that, painful as his wounds had been, the thought that in Prussia, and in his own dear city of Berlin, a subject had deliberately planned to take his life, had caused him still deeper pain: that event, however, had revealed sore spots in the body politic, which could be healed only by the strong hand of law; if this could be effected, he was glad to have bled for the general weal. Soon after reaching the palace, the Emperor dined alone, composed a private letter of thanks to the Crown Prince for the fidelity of *his* short administration, attended with the imperial family a short thanksgiving service in his private chapel, conducted by the court chaplain, Koegel, and witnessed the illumination in the evening. In spite of his wounds and his age—nearly eighty-two—he looks as hale and vigorous as he did ten years ago. He is a man of very simple and purely soldierly tastes and habits. But for the numerous elaborate presents from the Emperor of Russia, his private rooms in Berlin, which many have been allowed to see during his absence, are more simple than not a few New York parlors, and his private library is exclusively military. That one of the mildest, most amiable and venerable monarchs of Europe should be peppered in the back by rabbit-shot (as the late *attentat* was recently described by Bismarck in the Reichstag), is, indeed, bad enough; but the aristocratic re-action in public sentiment has been so great, and has been so dexterously utilized by the imperial cabinet, that it is probable, that, if socialism is the dangerous secret international organization it is often feared to be, some other country than Germany will be chosen for the present as the field of its active operations.

In a country so much governed as Germany, it is inevitable that the lower classes should infer that the Government is somewhat responsible for a general lack of business prosperity. We must not judge the Social-Democrats entirely from their printed programmes. Most of them believe that all rich men and the nobility are their enemies, and hoot and jeer at every liveried carriage (as they did a short time since in Tegel at the ordinary diplomatic equipage of the American minister), without having any sort of theory of the relations between labor and capital, and without any thought or suggestion, even as naïve as that of the unlimited issue of cheap money, respecting the ways and means of reform. They do not for the most part stand to their leaders in the relation of an intelligent constituency, nor are they as a body desperate or disloyal enough deliberately to plan, or even to wish, regicide. But French gold and the sudden expansion of the national spirit, the great influx of population from the *Dörfer* to the larger towns, increasing competition, the inflation of business, and the degeneration of the *morale*, and then the inevitable re-action, bringing hard times and high taxes, etc., all these have unsettled old ways and notions, and bred wide-spread discontent. It is the old, old tragedy of history, — an ignorant but contented and industrious proletariat disquieted in mind if not in fortune by too great a change of surroundings or by too sudden an influx of new ideas and ambitions. The religious press speaks of the attempted assassination as both the logical and the practical issue of the socialistic spirit; and this it ascribes to the current materialism of modern times, which has so destroyed moral vigor, high enthusiasms and ideals, that men prefer pleasure and possession to duty and virtue.

It is very difficult for an American to understand the religious condition of Germany. There seems everywhere to be a strong re-action against the naturalism of the founders of the Tübingen school. The cruder and indiscriminating forms of unbelief which are intolerant of Bible, church, and creed, are found no longer except among Socialists. Among the clergy of the Lutheran Church, there is the greatest diversity of sentiment and opinion, ranging from the philosophical rationalism of Strauss to the strictest sort of orthodoxy. A prominent clergyman lately complained to the writer that during the last twenty years, while Berlin had doubled in population, only two new churches had been built; and that the effects of the anti-Catholic agitation had been disastrous to religion, because both ignorance and malice had too often classed both faiths together, and thereby brought both into a sort of common disrepute; and because when the Catholic clergy, who are often only *Seminaristen*, were required on taking orders to pass an examination in the rudiments of science, the university-trained Protestant candidates had to do the same. Although the religious sentiment in the Teutonic heart is strong and ineradicable, it exists there independently of, and indifferent or else positively hostile to, even Scriptural dogma. A cultivated mother of a large family, e.g., a clergyman's daughter, and a very constant church-goer, rather surprised her husband the other day by saying in answer to the writer's questions that she never had believed in the miracles of the New Testament, nor in a personal immortality. Religious belief and rites are considered as æsthetic formulizations of pious feeling, and as a most essential part of the ideal side of life and cul-

ture, identified in its essence with the higher forms of art, and in its interests (as opposed to the modern materialistic philosophy of science and the understanding) with the idealistic and absolute philosophy of Fichte, Schelling, Hegel, etc., which have been so shocking to most American orthodoxies. Methodism, represented here by a little chapel with a congregation of less than forty, is absolutely unintelligible to the German mind. But, on the other hand, popular newspaper argument in favor of the English-American Sunday as a philosophical institution, bringing rest and inviting reflection, to which these nations owe so much of their business prosperity, has attracted considerable attention.

Let me remark in closing, that it is most refreshing to an American to observe how thoroughly respectable and cultivated most of the political leaders are. There is hardly a "self-made" man in the Reichstag. They are mostly men whose political convictions spring from, and are intrinsically and systematically bound up with, their personality and with their whole philosophy of life; so there is no question about their "record." There is no snatching at transient issues to win a transient fame. There are eight distinct parties represented in the North German Congress; and I cannot conceive of a discussion more pointed, briefer, more vigorous, all-sided, and exhaustive, yet more ineffectual in changing votes, than that on the recent anti-socialistic laws which I was privileged to hear.

HERMANN LOTZE.

IF we compare the influence of the idealistic philosophy of Germany with that of Puritanism in America, Kant with Edwards, and the systems of Fichte and Hegel with Methodism, Presbyterianism, etc., we shall get a fair and not very extravagant idea, not only of the moulding power of speculation on the Teutonic mind in the past, but of the difficulty yet rapidity with which these influences are now being cast off. Professor Lotze stands in some sense between the new and old order of intellectual things in Germany, where he is, perhaps, the most revered and influential of living teachers of philosophy. Thirty-five years ago, when he settled in little, old-fashioned Göttingen, where he still remains, despite attractive calls to larger universities, leading a life almost as uneventful as that of Kant, he was an authority in at least three of the medical sciences; and now there are very few intellectual men here under forty-five who have not been influenced by his writings. He has a veritable genius for the quiet enjoyment of art and nature. He never quotes, never indulges in polemics. His mental assimilation is so perfect, that there is no trace of cram in his pages, but the professor is sunk in the academician: in a word, he is now one of the noblest living humanists as contrasted with the specialist, on the one

hand, and with the eclectic, who holds that all is done and that the thinker has only to pick, on the other. His opinions are among the sanest and healthiest in the history of philosophy since Aristotle. Few men have enjoyed in a higher degree the supreme intellectual luxury of giving an all-sided and free expression to their personality. His philosophy is his daily inner and outer life. He never indoctrinates, but holds that the deepest motive of philosophizing is to utter and share humanities' doubts and ignorances with others. This is the deepest bond of sympathy between man and man. His pupils are not made disciples, but are confirmed and strengthened in their own natural, individual positions, which he is sure to enrich by a wealth of suggestions and *aperçus*, so that rational reflection becomes thereafter the most unsettling and weakening of intellectual pursuits. Philosophy, he holds, is not a system, but a developed intellectual character, and hence entirely valid only for the one who evolves it.

I do not purpose to epitomize his opinions in detail, but to show briefly that the "System of Philosophy" which he began two years ago, the second and recent volume of which I have just perused with some pain, by no means represents the Lotze whom I, with so many American students, have been wont to revere and love. The mechanical view of nature regards her invariable laws as universal, the world as an extremely complex and yet imperfectly understood machine, and even men as automata. It asserts that there is no chaos and no real freedom, and holds that to obtain clear mental pictures, making thought the surrogate of sense, and mathematical formulæ of relations in time

and space the highest science, is the end of all thinking. Even virtue has become mechanical, regulated by artificial moral laws which regard certain specific acts as everywhere and at all times right or wrong. Trade has become an immense engine, which is nowhere understood and still less controlled. The modern festival is the industrial exposition. Business, that monstrous creation of modern life, has usurped, specialized, and degraded, if not destroyed, honest, independent, man-making work. Teaching addresses mainly the eye with charts, curves, and apparatus. Even religion and the church, says Lotze, are mechanized. The church belief is a creed, its duties formal; its evidences are historical, external, or at best syllogistic; and Christian teachers favor these tendencies, and refuse to see that their cause is one with the ideal philosophy. This to him is the saddest aspect of modern times. Opposition to this view has become the ground-motive of all Lotze's philosophizing; and, as his early advocacy of it has given his former materialistic friends occasion to charge him with apostasy, so the concessions he now makes to it will surprise, and perhaps at first disconcert, many English readers who have heard him quoted as a great champion of religion against science.

Atoms, he says, need not be simple or unextended. It is enough that they are hyper-sensuous. Perhaps, although the most subtle and primitive of all things, even they have their periods, and are circuiting back to an earlier condition. Indeed, they may have already had thousands of changes and conditions; so that we do not eternalize memory by making it inherent in them. Thus the ground of all life is chemical change

unmodified and uncontrolled by any vital force. The only possible definite conception or mental picture we can form of ourselves is as an eddy or whirlpool in the straight current of natural forces. As the waves made the reef which causes them, so they will wear it away. This, the mechanical view of things, he says, is absolutely universal in extent, but everywhere secondary in importance. The *Gemüth* has other needs; and, according as they are unanswered, men fall into pessimism. The world of forms and means should be subordinate to the world of worths and ends, which latter alone are "really real." There is a realism of conscience, he says, where ideals are actual without their instrumentalities, where supreme happiness exists without being bound to its conditions, and where intuitions of truth do not depend upon either their logical or their causal connections. The universe is all miracle and poetry: it is lawful and prosaic only to a one-sided apprehension. In his new logic he asserts that there is a final synthetic truth, not merely actual but self-evident, not merely logical but æsthetic, proved by the absurdity of the opposite and not by the impossibility of thinking it. Logical progress is henceforth to consist, not in the formulation of new laws of thought, but in increasing knowledge of what is presupposed as the highest self-evolving principle. Its content is pure being, — beauty, goodness, personality, etc. The so-called laws of association are but a weird and casual reconstruction of this universe, broken up by the weakness and finiteness of ordinary consciousness into glimpses. The soul must have or make objective expressions for its own needs and nature, and these will be superstitions just so far as the world

of understanding is insufficient for such expression. The supreme postulate of logic, according to Lotze, is some one major premise for all its conclusions, which expresses the movement of the collective cosmos. This bottom principle is nowhere defined, and is, in fact, undefinable, but is best described as teleological. Theological philosophy thought it was giving to this supreme principle — which is more than can yet be called thought — an honorable elucidation by raising it out of the dimness of being, clung to by the whole soul, to the dignity of an objective notion, calling it God, and analyzing it into attributes, and making it the hero of a creative drama, etc. This he regards as idolatrous. Thus, in his unprinted lectures on religious philosophy he has little or nothing to say of Christianity, partly, as he lately told the writer, because so many of his hearers were Jews, but principally, no doubt, because he regards it as a special and chiefly practical solution of the more general problems which underlie all religions and philosophy alike.

No system, however, is perfect; and I believe Lotze's to have several minor and one fundamental error. Instead of urging that philosophy is at best the expression of personal opinion, and can never have any thing like authority over others, as at first, the tone of his later work is often assumptive, even dogmatic. In all, feeling — "which more than knowledge expresses the true nature of *Geist*" — is made as much the organ of a transcendental world as Fichte's practical ego. Lotze's mind is essentially poetic, and yet he remains strangely insensible to the new and incomparable sources of poetic inspiration which modern science has opened to the world. Much as he adds to

the noble enjoyment which those who read him will know how to extract from life, the line cannot be drawn too hard and fast between speculations like Lotze's and a truly scientific philosophy. The world of law is to him like the old dispensation, to be superseded, not entirely without a break in the development, by a new. He refuses to trust science to work out its own salvation. He is the noblest of modern sentimentalists. His demands upon the world for individual æsthetic enjoyment are exorbitant and almost unparalleled. It never occurs to his refined and subtle hedonism that man's right to happiness at all is as yet quite assumptive. I deem this position in its practical effects scarcely less than immoral and socialistic. We are in the world to work. It costs hard labor of muscle or brain to live, rear a family, be respectable, and provide for decent burial; and what right has this philosopher, idly perched upon his twig, to talk with such moving, maddening pathos about a world of "worths and goods to be purely and passively enjoyed," when his own department was never more hopeful and in such crying need of self-sacrificing toil as now? We want to push on the psycho-physic studies which Fechner has begun and left in the most interesting and suggestive stage of incompleteness; to carry on the analysis of æsthetic sensation of the Helmholtz school; to determine how far physiological psychology can justify new or old methods, critical judgments of art, etc.; to advance investigations respecting the structure and functions of nervous tracts and centres; to know more about the senses, the muscles, and the will, the origin of man and the unfolding of his faculties, in the hope of learning some-

thing more thereby of the validity of human experience, the scope, laws, and limits of knowledge, and, above all, of the methods of education, and of the nature and forms of duty. That, with his fitting scientific training, early bias, and rare psychological acumen, Lotze has contributed almost nothing since the "Medical Psychology" to the solution of any of these questions, I am sometimes tempted to consider as no less than reprehensible; for, great good as he has done, he might, with his rare gifts, have done far more, had he not been led away by the sirens of æsthetic optimism to revery and pensive quietism. If the universe is composed of personal spirits, with "free inner spontaneity" consenting to be harnessed into mechanism in order to realize and unfold in corporeal form the beauty and goodness of the eternal idea, and if "personality can never become an intellectual problem to persons," then the whole psychological tendency of recent natural, and even physical, science, is simply the greatest illusion of modern culture.

IS ÆSTHETICS A SCIENCE?

WHAT is the origin, nature, and highest form of æsthetic pleasure? For many artists this now unfortunately seems a purely metaphysical question, the discussion of which is as irrelevant as for a mason to fall to discussing the *rem per se* of his brick and mortar. For many connoisseurs of art it is a purely individual question, because we are reminded there is no disputing about taste. For many philosophic writers the question is sufficiently answered by the formulæ of Hegel. Art, they tell us, is the absolute idea immediately presented to sense. In symbolic art, typified, e.g., in Egypt, matter preponderates, and the ideal struggles through it, and attains only an imperfect expression; in classic art, matter and ideal are mutually expressive, adequate and befitting; and in romantic art the ideal preponderates, and the material is able to serve only as a hint or allegory of what to it is inexpressible. Thus the first and lowest forms of art are gardening and architecture; then follow sculpture, painting, music, and lastly poetry, which merges by insensible gradations into religion, the doctrines and institutions of which, though in very different senses, were made the supreme form of æsthetic expression by Schleiermacher and Strauss. Others still find a ray of light in Schopenhauer, who said that when we contemplate a work of true art we not merely find

the only possible surcease from the universal anguish, but lose ourselves, not in the particular object contemplated, but, through it, in the platonic ideal, or purest objective form of will, which it illustrates. Vague and intangible as are such answers, they have at least given us glimpses of the vastness of the problem and the depth of our ignorance about it.

The philosophy of evolution next attempted to explain pleasure as a sense of usefulness, and pain as a feeling of the diminution of vital functions. The sweet taste of sugar-of-lead really augments the vitality of the organs of taste, though it happens to be poison in the stomach. A pleasant sound favors the nutrition of the auditory nerve, a beautiful picture that of the visual organs, etc. This, again, seems to me ingenious, and as such provisionally credible enough, but almost purely hypothetical and unproven. Are the terms convertible? and is nutrition æsthetic? If so, sleep is higher than art.

In Germany the subject has been approached in two other directions with at least very hopeful results. Zeising, and later and more fully Fechner,¹ starting with the simplest forms of geometric figures, have inquired, first, how must a horizontal, and, secondly, how must a vertical line, be divided in order to give most pleasure to the eye; and, thirdly, what is the most symmetrical way of uniting both in the form of a cross or a right-angled quadrilateral. The opinions of scores of people of different nations, degrees of culture, etc., were collected and averaged; and the result, given with much unanimity, was, that when the whole of a straight line was to its longer as the latter to its shorter section

¹ See *Vorschule der Aesthetik*. 1878.

the most pleasing impression was produced. This "golden section" determines the position of the horizontal on the vertical arm of a cross, the long to the short sides of a parallelogram, etc. : this, it was said, corresponds nearly to the side or ground forms of the most pleasing architectural structures, a number of which have since been built on that pattern ; and it has been developed with great ingenuity into real or fancied coincidences with the relations between ground tones and harmonies in music. Here, again, we cannot forget that the average opinions only approximate, without exactly giving this relation ; nor can we believe the subtle influences of association are escaped, as is asserted, by dealing with such simple visual forms. These at least, as well as the almost infinite complication involved, would come in to prevent the extension of this method to more compound forms, colors, sounds, etc., as is suggested.

The other direction is best illustrated by the psychophysical analysis of the sensations of sound, which has shown that the accepted intervals between notes in a tempered octave like that, e.g., of the piano, are not mathematically pure, and that the notes, for the purposes of the most perfect harmony, are not "real." Three varieties of enharmonic organ have been invented to remedy this evil. Bosanquet's, e.g., has fifty-three notes in an octave. These are used, not only for training the ear and for accompanying the voice, but in one case for playing accordant overtones and omitting the rest, each note being more or less uncolored. The sound produced by these instruments is certainly an almost new and exquisite sensation. There was a strange purity and ringing clearness about the tones

and chords, which I heard for the first time in another room without knowing the instrument, and thus without expectancy or association. The immense number of keys increases greatly the manual labor of playing, and makes quick music impossible; while the labor of composing, writing, and reading must be increased.

The question whether such instruments foreshadow a new sort of music of the future, or belong simply to the curious demonstrative apparatus of the scientific lecture-room (like Costel's *clavecin oculaire*, or visual harpsichord, by which a symphony of colors, divided on the color scale by the same mathematical relations of wave-lengths as notes in the scale, was flashed over the field of vision soon after the laws of complementary colors were developed, and which threatened at one time a new chromatic dispensation), is the question of practical interest. It is a generic question — viz., Is practice still so far ahead of theory in the domain of æsthetics, or does æsthetics embrace so many other than the purely rational elements that we can never be told with any scientific authority what we ought to like or dislike? Ought artists to credit it as an additional proof of the accuracy of the Greek eye, that, if the horizontal lines of the Parthenon slightly incline to the right and left, it is to compensate the slight distortion of every horizontal line to the normal eye, or that some attitudes of a galloping horse, instantaneously photographed by a new method, correspond to equine postures found upon the Elgin marbles, if at the same time other details, no less observable and perhaps more serviceable, like perpendicular visual directions in the columns of ancient temples, and the second phase of the horse's spring, etc., are, so far as known, ignored

in the Greek art? Should German poets listen to Brücke, e.g., when he writes on a revolving drum the mathematical time relations of anapests, spondees, cæsuras, accents, etc., and thus demonstrates that the laws of metre for the German tongue make certain verse-forms, borrowed from the classics, logically unusable, or others, hitherto unknown, possible, or shows the natural sub-rhythms of the muscles of the chest, larynx, etc.? Should painters listen to Helmholtz on the laws of saturation, intensity, and contrast of colors, even if he points out errors in the great masters? Should architects trouble themselves about such average impressions respecting proportion as Fechner has collected?¹

Any answer to these questions, especially an unqualified affirmative, seems to me premature; but I think any discussion of it would be likely to be rather more meaty than the inane speculations about the nature of the Beautiful and Sublime which fill so many pages of text-books on æsthetics. Certainly, science has not yet disclosed the foundations for a radically new synthesis of any art. The moral sense has long been accustomed to all sorts of theoretic explanation and dictation. Of this the æsthetic sense has been less tolerant, though it admits the need, not only of culture, but of instruction. For my part, I am unable to believe that fashions will ever be set, or child's playthings chosen, by a quadrennial congress of professors of æsthetics, or that the scale in which Beethoven wrote

¹ For two of the most suggestive pamphlets discussing one interesting aspect of physiological-psychology as applied to architecture, see *Optische Tatsächungen auf dem Gebiete der Architectur*. Von A. Thiersch. Berlin, 1873. Also, *Die subjective Perspektive und die horizontalen Curvaturen des dorischen Styls*. Von Dr. Guido Hauck. Stuttgart, 1879.

will ever be regarded as a rude hieroglyphic alphabet of sound, or that Titian will be called a poor colorist because he did not know whether his strongest contrasts were mathematically complementary. At the same time I fancy it may behoove the artist of the future to be more instructed in the scientific aspects of his department, and perhaps a trifle less fearful of impairing creative faculty by the cultivation of critical acumen. Perhaps the understanding has a sort of satisfaction peculiar to itself which may justly be called æsthetic.

THE GERMAN SCIENCE.

THERE was a time when philosophy was in a peculiar sense the national passion of the German mind, and when every intellectual man, if, indeed, he had no system of his own, was proud to be called a disciple of some great thinker, who had construed the universe to his own mind, and dictated his own terms to every special science. Even Krause planned a congress of philosophers to organize the departments of human knowledge into some solidary encyclopædic form for purposes of both education and research. His plan came to nought, only because it was a little too late; and, if people laughed, it was because they had just begun to realize that philosophy in the sense then current meant individualism sharpened and defined to the utmost, and that, if a philosopher would enjoy in peace the full fruition of his own opinions, he must keep aloof from other philosophers.

Physiology is not a little indebted to philosophy. Medicine first became a science, according to Helmholtz, with the establishment of the law of the specific energy of the nerves, which he compares in importance to the discovery of the Newtonian law of gravity. For this law, in the wide sense of Johannes Müller, science is unquestionably indebted to the Kantian philosophy; and on the basis of this principle, and led by impulses

which are more or less directly traceable to the Herbartian system, men like Lotze, Wundt, and others have been led from physiology back to philosophy again; and, what is far more important, the medical profession is once more slowly gaining a position of influence in the intellectual world such as it never occupied before. In the middle ages physicians were always the *Aufklärer*; and now individuals among them have done work for science which actually recalls to mind the old Hippocratic maxim, "God-like is the doctor who is also a philosopher."

Physiology has been characterized as just now pre-eminently *the* German science. This is probably true, whether it means that German physiologic methods and results are less known in other countries than those of other sciences, or that they reflect more peculiarly the national characteristics. Till Foster's text-book appeared, very little was known in England and America of German physiology save by specialists who themselves had studied in Germany. The German observer is no more acute in studying morbid symptoms or anatomical forms of animal life than the English or French. But the former is not satisfied merely to observe: he has a passion for making his own conditions. It is not enough to record the normal functions of a tissue, but it must be made to work under artificial conditions — *in vacuo*, with electrical and thermal stimulation, and under the influence of divers gases and chemical compounds. The action of the organs is studied by extirpating, laming, or poisoning them all, with a view to learn how to reproduce normal conditions. If the German observer sometimes forgets that his science is but a part of man's world-old fight

against his greatest enemy, disease, and pursues his science merely for love of the strangely-fascinating insight it brings him, it is a noble error, more than excusable, even on the ground of the greatest practical utility, in which the pursuit of truth for its own sake has issued so often in the history of science. Again, in England and France a scientific man may be a merely descriptive physicist without much knowledge of mathematics,—a thing almost unknown in Germany, where even the physiologist finds it indispensable to understand at least the elements of the higher mathematics, so universal are mechanical ideals, and so needful is it to bring his results into at least approximately exact form.

As an illustration of the scope of these methods, we may mention Dr. Lilienfeld's volumes in politico-social science, on the physiology of the state, in which commerce is treated under the rubrics of the circulatory system, schools and printed matter under that of the nervous system, etc., in a way which would have delighted Hobbes himself. And again, to borrow an illustration from Helmholtz, as the microscopist when he reaches the limits of visibility must turn all his attention to the study and improvement of his instrument, so now more than any other the physiologist of the nervous system has reached a point where he must turn the greater part of his attention to the chief instrument with which he works,—viz., the human mind. In a peculiar sense true science here can be grounded only on the fundamental laws of psychic processes. Fick terms physiology "the highest and most fruitful generalization of the collective natural sciences." Czermak, who devoted his wealth to building and

equipping a magnificent laboratory and lecture-room, and his time to the end of his life to the popularization of physiology among the general public, was never weary of insisting that it should be taught in every high-school. Once more, evolution in the sense of either Darwin or Haeckel is far from being a finality for the physiologist. It is for him rather a morphological assumption that all animals and men belong to one family; and he defines his science, with Pflüger, as the chemistry and the physics of living matter. Czermak defines its object to be the development of the phenomena of life from the laws of these two sciences by experimentation. Accordingly, most of the younger men devote themselves more or less exclusively to one or the other of these halves of a science, which is rapidly growing beyond the possibility of mastery by any single mind; and some laboratories, like those of Heidelberg and Bonn, are pre-eminent in the chemical, others in the physico-mechanical, side of physiology. If a single professor is generally at the head of a laboratory, it is in many if not most cases rather on account of the practical difficulties, such as interference of authority, etc., of having two professors of co-ordinate rank, than because it is now regarded as a strictly integral science.

About three years ago Professor Hermann of Zürich was induced by Vogel's publishing house to edit a brief but comprehensive encyclopædia of physiology. The same thing was undertaken thirty years ago, in the youth of the science, in Wagner's still famous handbook, where, in the compass of four good-sized volumes, a dozen professors treated most of the leading topics of the science monographically in so thorough a

way that the book gives an admirable picture of its condition at that time. The sixth volume, completing the first half (or over 2,300 pages) of Hermann's work, has just appeared.¹ The first volume is devoted to the contraction, excitation, and fatigue of muscles. It contains an interesting chapter on that most fascinating of all the topics of myology, — the electrical current of muscles. This, by Hermann himself, affords him a chance to re-state his objections to Du Bois-Reymond's molecular theory, which is becoming more questionable every day. Professor Nasse describes the chemical properties of muscles; and Professor Engelmann, on protoplasmic and ciliary motion, concludes the volume. The larger part of the second volume is taken up by Professor Grützner's physiology of the voice and of language; which shows us, among other things, how completely the training of the voice, the nature of vowels and consonants, accent, and even perhaps the origin of words, have become matters of physiological science. Professor Fick concludes with a chapter on the mechanics of movement. The third volume is devoted to the general properties of nervous tissue, and to the special characteristics of the spinal and cerebral nerves. In the third volume Professor Eckhard discusses reflex action and the other properties of the spinal cord and cerebellum and the cerebral ganglia; and Professor Exner, under the head of physiology of the cortex of the brain, treats sensory and motor impulses, the time of various psychic processes, attention, sleep, localization of functions, etc. The fifth, and by

¹ *Handbuch der Physiologie*, bearbeitet von 24 Professoren, herausgegeben von Dr. L. Hermann, Professor der Physiologie an der Universität Zürich. Zürich, 1879-80.

far the ablest volume, is devoted to the sense of sight. The dioptric and retinal functions of the eye are presented by Professor Fick. Professor Kühne writes a chapter on his famous retinal-purple, or the photographing powers of the retina; and Professor Hering, the great apostle of nativism as opposed to the empiricism of the Helmholtz school, concludes with a psychological chapter on the sense of space and the movement of the eye. The sense of hearing, by Professor Hensen, takes up the first part of the sixth volume; and taste, smell, touch, and the sense of temperature, by different authors, conclude it. The bibliography throughout is very full and valuable, and the work will of course supersede the score of smaller text-books which are still in the market.

In spite of the great merit of the work of Professors Hermann, Exner, Hering, and perhaps of Grützner, the book, as a whole, has several grave defects, and does not, as Wagner's 'Handwörterbuch' did in its day, give us, in all respects, an adequate view of the physiology of its time. I will not speak of the occasional repetitions, trifling defects of arrangement, the omissions of the department of development history, the somewhat stultifying effect upon many German investigators of writing pages which cannot by contract be made the vehicle of communicating original researches; but only mention, first, that the name of the four most eminent physiologists, Ludwig, Brücke, Reymond, and Pflüger, do not appear in the list of authors, and the two large universities of Berlin and Leipzig are not represented at all. The two last professors in particular, and all four to a degree, are representatives of views which have been more or less hotly contested for

years ; and their antagonists, doubtless with the truest aim to be impartial, have written with a decided *tendance*, if not occasionally with a partisan spirit. There are certainly important phases of the science of which the advocates are still living, and which are very meagrely presented. It would be interesting to go somewhat into details here, but I have left myself no space. The book is often uncritical and not well digested. The most striking instance of this is the work of Professor Eckhard, whose introductory historical sketch is little more than an advertisement of a book he intends to write, with copious citations of authorities which it often seems as if he could not possibly have read, so inadequate is his treatment of their contents. The same may be said, though in much less degree, of Professor Funke's work, which, it should be observed, however, was finished and reviewed by another hand after his death, and also of most of Fick's work. Moreover, it will hardly be regarded as a merit by many, that the optical part is made supplementary to Helmholtz's Optics, since the latter, valuable as it is, is and will long be out of print. In spite of all this, these six volumes are of course indispensable to every psychologist. The remainder of the work is mainly devoted to chemical-physiology.

ARE THE GERMAN UNIVERSITIES DECLINING ?

A WRITER in the last July number of "Macmillan's Magazine" answers this question with an emphatic affirmative. Centralization, governmental interference, compulsory military service for students, the small pay of the younger teachers, he urges, have combined with other and minor causes to restrict the rôle which the universities formerly played in the national life and thought. These conclusions, based on observation of one of the smaller universities, do great injustice to the larger ones, of which this writer confessedly has known but little. The question is of vital importance for an increasing number of young graduates in this country.

In the first place, it is well known that many of the German universities were founded by petty principalities in a spirit of rivalry. A century ago there were nearly fifty of them. Patriotism and local pride bound teacher and student each to his own university. The corps which kept alive these sentiments have decayed or changed, and the attractions of the large centres have increased. At the smaller universities are now found impecunious students from the neighborhood, young professors in training for better places elsewhere, together with a few older men, some of whom, like Lotze at Göttingen, have made it a point of honor

to decline calls to larger auditoriums. Students are sometimes allowed to serve their year in the army, and to attend lectures at the same time. Hence the withdrawal of a regiment which had been stationed at Heidelberg diminished the number of students there. The professor who has but a handful of students often gives very poor lectures, and spends most of his time and energy in writing. In every case of advancement he knows that he will be judged solely by the amount and quality of his publications; hence the quantity and often the immaturity of them. One who has written little or nothing is almost never promoted. Again, the government has in most cases transferred the authority to punish students' misdemeanors from the old university tribunal to the police or civil courts, but has left the ancient system unaltered in certain of the larger universities. This measure deeply incensed the students, who thought it so slight a disgrace to be convicted by a *Pedell* that their corps badges might often be seen displayed behind the bars of the university prison-room. Why Berlin and Leipzig should retain the old system of legitimation and matriculation cards, while Giessen and Erlangen are not allowed to do so, is not clear. With inferior laboratories and libraries, with their productions often slightly referred to or wholly ignored by professors of their own department in the larger centres, the faculties of the smaller universities can compete in no way save by practically lowering the requirements or the price for degrees and examinations. Even the facility with which the student can now migrate from one university to another is unfavorable for the smaller ones. For the latter the "decline," relative or absolute, is thus

evident enough, and is likely to continue with increasing centralization. They may eventually become gymnasias or *real-schools*, training young men either for business or for entrance into the large universities, or else, and perhaps more likely, cease to exist altogether. Their probable fate in this respect is not unlike that of many of our own rural or Western colleges. However much may be said, and however truly, about the advantages of a country location, it is now pretty clear that the large universities of the future will be in or near the large cities.

When restricted to the larger universities, the question of decline is somewhat harder to determine. The professors, so numerous and so authoritative in legislative bodies a few decades ago at the beginning of parliamentary life in Germany, are now for the most part excluded from political and administrative affairs. The chief party leaders and journalists, with a few conspicuous exceptions, belong to no faculties. So far from the heads of departments being influenced in their policies by professors, as was common fifty years ago, in the age of the great systems of philosophy, the state now regards the universities as one of the means for the accomplishment of its ends, which they are too unpractical to be trusted to determine without guidance or even dictation. Hence no complaint is more common in university circles than that of the absoluteness of the state, which, although generally leaving the universities to manage their own affairs as of old, has not scrupled on several conspicuous occasions of late to assert its supremacy, reversing the decisions of academic senates, and even deposing professors and suppressing their works. Teachers of political or

philosophical subjects who show their loyalty by zealously espousing the cause of the Government are generally promoted rapidly. At the same time academic freedom, even here, is not seriously or unwisely restricted.

Nepotism is a more real though not yet alarming danger. This occurs more often than elsewhere in the large laboratories, and usually somewhat as follows: The chief professor of a department lives in the building where he experiments and lectures. He has the power to appoint his own *famulus* to wash crucibles, scour up his instruments, etc. The salary for these duties is little or nothing beyond, perhaps, free tuition; and his own son, who is just beginning to hear lectures, takes the position without objection, and perhaps later even assists the father in experimenting before a lower class. After graduation he is regularly appointed assistant, and, on passing the examination of a docent, can begin to lecture, using the apparatus of the father, who leaves him one choice examination-topic after another, till students of the department *must* hear him. We know one professor who has thus two members of his own family under him in various stages of advancement. Away from the patronage of a large laboratory, and hence throughout the academic department, this evil, though by no means unknown, is less liable to exist. The son is prone to seek to follow the occupation of the father, has the advantage of superior parental discipline, and should, of course, have the benefit of every such fair prestige.

The social attractions of a great city like Berlin seem making themselves felt unfavorably upon the younger professors there. To be introduced at court, to re-

ceive visits in the laboratory and lecture-room from members of the royal family, to be invited to conferences about the education of princes, and to receive honorary titles and medals; to be elected to active membership in various societies and administrative bodies, to superintend the construction and furnishing of hospitals and laboratories, to give popular lectures, and to be urged by publishing houses to print something, any thing,—premature or popular though it be,—these are some of the often too seductive incidents of professorial life in Berlin. It used to be shocking enough to a German *savant* to be called popular, like his Paris *confrères*: it is less so now. Indeed, he loves to be the first to popularize his own discovery. Yet the competition for place and preferment in the capital is so intense that even these untoward influences affect for the most part only those who feel their positions tolerably well assured. For these the fact that a reputation once made lasts longer without effort to keep it up than elsewhere, only aggravates the evil, while the remuneration attached to these positions is now so ample that the old stress of necessity to eke out an income by writing is removed.

In the department of philosophy, in the technical sense, there has been an unquestioned decline. The history of philosophic thought is likely to remain one of the most popular and important university topics, but the taste for original speculation is gone. There is no metaphysics to speak of, save in the new sense which embraces the theory of the constitution of matter and the nature and laws of force. Physiological psychology has recently assumed an almost supreme position in the philosophic curriculum. The other

philosophers devote themselves to the theory and history of education, *Culturgeschichte*, æsthetics, free-religious exposition, or else represent special past schools of thought. Of eight nominal professors of philosophy in Leipzig, but two can be called very strong or influential men. For many centuries philosophy was devoted to rationally determining and exploring the foundations of religion: it now performs the same function for science. The old idealism, which used to be the dominant influence in the universities, is gone. Since the death of Rosenkranz not a single Hegelian professor lectures in Germany. While these old systems prevailed, science—even the medical sciences, the most practical of all—was in a lower condition than in France, England, or even Italy. When, however, its doctrines began to be tested by observation, as those of Schelling and Hegel were in the old *Natur-philosophie*, and by experiment, as those of Kant were and still are by physiological studies of sensation, then the impulses generated by speculation began to animate scientific research. The peculiar and increasing pre-eminence of the German universities is now in the field of experimental science. Archæology, philology, history, law, etc., have had their great triumphs, and have certain great monuments already completed, and are doing, perhaps, as valuable work as ever; but the cultivation of science during the past twenty-five years has increased far faster. Most of the many new buildings which the universities have erected during that time are for scientific work or collections. Here all talk of decline is simply preposterous. In the above interval the number of scientific instructors has more than quadrupled, and seems likely to continue to increase in the future.

In this, then, perhaps even more than in other respects and than heretofore, the universities both lead and reflect the national, and we might almost add modern, life. The severe inductive methods, the thorough departmental organization, the weekly meetings for discussion of new discoveries, and the often fervid ardor of investigation in the scientific field, have not been without stimulating influence upon the other departments. One of the grandest things about the German universities is, that they are devised, unlike ours, as much for the education of the professor as for that of the student. Another is, that, unlike ours, they are pure republics, with perfect academic freedom for all who can pass the required examinations to lecture upon any subject, and, with the slight political qualification mentioned above, from any standpoint. The result is, that the student is brought into the close contact of the laboratory with the best professors, learns to feel through them the genial warmth with which new creations or discoveries arise in the intellectual world, and thus is saved from the danger of losing enthusiasm without gaining insight, —a danger to which all young men are liable, particularly if their teachers are drill-masters, instead of being educators in the broader sense. The writer has spent more than four years in four of the principal German universities, and is convinced that in each of these latter and essential respects, and upon the whole, they were never so influential or so truly prosperous as to-day. May they never be less so!

FOWLER'S LOCKE¹ AND GERMAN PSYCHOLOGY.

MORE than half of this little volume is biographical, and for this part of it the author acknowledges his obligations to Mr. Fox Bourne's recently-published life of the philosopher. Only a single chapter of twenty-five pages is devoted to the "Essay;" while others are occupied respectively with Locke's opinions on religion and morals and his theological writings, the "Thoughts on Education," and the "Conduct of the Understanding," and works on government, trade, and finance. Almost no attempt is made to estimate Locke's indebtedness to thinkers who preceded him; and but a few pages are given to describing his influence on subsequent thought. The author has evidently read even the less known of Locke's writings with care, quotes him judiciously, seems generally in sympathy with him, and has written an extremely readable book; but he apparently abandoned at the outset the idea of saying any thing new about his subject, and thus rarely comes into close quarters with it; while occasionally there is a certain reticence which savors of constraint, and which is in unfavorable contrast with Huxley's treatment of Hume in the same series.

¹ Locke. By Thomas Fowler, Professor of Logic in the University of Oxford. New York: Harper & Brothers. 1890.

Half a dozen pages of criticism of the "Essay" constitute the most interesting part of the book. Locke derived all knowledge from the experience of the *individual*, and could give no other account of the "inherent faculties" needful to acquire it than that God had furnished or "endued" us with them. Kant well said that the problem of the origin of these faculties could not be left here; but, although he attempted an analysis of the *à priori* element of knowledge, he attempted no explanation of its origin. Fowler admits that this "mystery is removed at least several stages back" by applying the principle of heredity, or, "in one word, of evolution. This explanation may have its difficulties; but it is, at any rate, an attempt at an explanation where no other such attempt exists." Locke's peculiar contributions "consisted in his skilful and popular delineation of the *à posteriori* element in knowledge, and in his masterly exposure of the insufficiency of the account of the *à priori* element as then commonly given." The other defect pointed out in the "Essay" is the "tendency to bring into undue prominence the passive receptivities of the mind, and to ignore its activity and spontaneity." But now "a more scientific psychology than was possible in Locke's day comes to our aid, and shows, as is done by Mr. Bain and other recent writers, that the nerves, stored with energy, often discharge themselves of their own accord; and that movement is at least as much an original factor in animal life as is sensation, while sometimes it even precedes it in time." With far greater propriety than Descartes, Locke deserves to be called the first to apply the introspective method; while by his frequent references to the mental processes of

children and savages the comparative method is also suggested.

This is good and true as far as it goes. The earliest questions in mental philosophy were those concerning the essence, constitution, seat, origin, and future state of the soul. These, however, are purely metaphysical questions, which stand behind psychology, and may have, perhaps, a sort of ulterior justification, but are as unscientific now as if physics, instead of confining itself to the specific phenomena of light, heat, sound, electricity, etc., should squander its energy in reasoning about the ultimate constitution of matter and the nature of force—thus beginning where it should end. This is the old deductive method of the so-called “rational psychology,” an example of which we have in this country in Dr. Hickock’s well-known text-book having that title. The simplicity, immateriality, unity, and indestructibility of the soul are assumed at the outset; and psychic phenomena are derived from such hypotheses and pre-suppositions. It is, as Wundt has somewhere observed, because psychologists assumed this method, and sought so long for new standpoints and new ideas, hoping that some of them would shed sudden light or bring sudden order into a dark chaos of miscellaneous facts, that psychology remained so long stationary, and, more than any other scientific field, was crowded with prejudices and pre-suppositions. The great significance of Locke’s work is, that it is a standing protest against all forms and applications of this method. It is still profitable reading wherever the insidious old method is yet in vogue. By insisting that the fundamental ideas of the soul were products of experience, instead of being innate in the old sense, Locke took the first great

step toward making psychology at the same time a natural science, and central and fundamental among the mental sciences ; for, in proportion as it has been more and more clearly seen that philosophy must rest on experience like other sciences, psychology has received more attention and acquired greater significance, till, for those who can follow Wundt, "it is scarcely too much to say that all our philosophy is at present psychology." Professor Fowler seems more in sympathy with Locke's own limited views than with those larger historic motives which centre in and were mediated by him.

Again, Locke was only a pioneer, or at most the first-fruits, of a true psychology. His was the introspective, or, as it has with but partial justification since been called, *empirical* method. But self-observation can at best give us but a few of the manifold facts of consciousness. It cannot analyze them into their unconscious elements and causes. It can give them no objective certainty or warrant. Its emphasis is only the casual, relative, and variable one of subjective feeling, interest, etc., so that it is peculiarly liable to the errors of dogmatism and individualism. Introspection can never be relied on to give the true organic connection between the so-called facts of consciousness ; and it was for this reason, as it is now commonly said in Germany, that the fashion arose of regarding the various forms of psychic activity as due to distinct, arbitrarily assumed mental powers or faculties, so loosely connected that Fichte, Schelling, and Hegel, and their followers, readily built them, each in its distinct place, into their vast ideal systems, giving them a factitious logical unity, ignoring their real connection in

experience, and almost forgetting that there was such a thing as psychology, because they had assumed that knowledge had no limits and its origin was of no consequence. Locke must take his share of responsibility — not a very great one — for such abuses of his method. His mind was, as Schwegler well says, more acute than profound. He did not see very clearly that introspection is only one of the Baconian methods of induction. The necessity of an experimental psychology, now so well established and so universally recognized in Germany, which thus more than atones for its long neglect or disparagement of Locke, we think would have met with a more cordial recognition from him than it seems to from Professor Fowler, who entirely ignores it, and whose psychologic ken does not range beyond Spencer and Bain. It is much for a professor at conservative Oxford — whence Locke was so unceremoniously expelled two centuries ago — to admit, with however much qualification, that psychology is, or can become, a natural science. It is this, and more. Its facts cannot only be observed — they can be controlled, so that it rests on a basis of experiment. Psycho-physic methods have resolved our sensations into their elements, designated the neural centres and conditions for many processes, measured the time of nearly all the simpler psychic operations, established in tangible neurological terms the difference between normal and pathological action, brought a large number of questions but lately thought to be unanswerable within the range of possible experiment, so that the study of mind is just now the most hopeful and promising of all the departments of science, and greatly improved our conception of such funda-

mental ideas as time and space, as well as of attention, memory, association, etc. How Locke would have welcomed all this! His soul was too profoundly religious to have shared the shallow fear of materialism; for he even held that God might have, and possibly, though not probably, had, endowed matter with the power of thought.

Locke is thus the intellectual father of all those who believe that the nature of our faculties is the first and fundamental problem of philosophy, and that psychology relegates most of the purely speculative systems to the same limbo to which the earlier theories of vision and audition are consigned by physiological optics and acoustics. Leibnitz, and even Kant, who started from the same assumption as Locke, clung to the belief that there were in knowledge elements of a universality and necessity not to be accounted for by experience or association. What the doctrine of innate ideas was to mind, the notions of evolution and heredity now are to character. Children, so it is commonly stated, inherit their fundamental traits, dispositions, etc., from the experience of countless ancestral generations, so that these are irreversible. The child must be instructed rather than trained, and allowed and encouraged to develop his bent freely and without restraint. But not only the exceptional non-development and helplessness of the human infant, but also the long period of growth, immaturity, and teachableness, indicate plainly enough that individualism in this sense is very liable to be only the product of caprice or accident. Against this notion Locke's "Thoughts on Education" is the most able of protests. Virtue, practical worldly wisdom, good-breeding, and last,

“though this may seem strange in the mouth of a bookish man,” learning, as something which may be easily and incidentally had “into the bargain,” are the objects of education in the order of their importance. To this extent character is the product of education, as knowledge is of experience, so that here again Locke is most modern and most German.

SPIRITUALISM IN GERMANY.

NEAR the end of the last century Professor Gauss, of Göttingen, one of the most distinguished of modern mathematicians, attempted to show that the familiar axiom of Euclid, that parallel lines might be infinitely prolonged without meeting, could not be proved, was unnecessary, and impaired the certainty of geometrical reasoning. Under the new and more generic mathematical method of treating surfaces which he originated, cases might occur of a so-called negative measure of curvature in which this axiom was false. In a paper published in 1868 Professor Riemann generalized the common formula by which the position of any point in ordinary space may be determined by measuring three co-ordinates, by supposing the number of these co-ordinates to be represented by n , or to be indefinite. If this were possible, the magnitude—in this case space—would have n dimensions, to each of which all Gauss's laws respecting surfaces are applicable. This gives a new mathematical conception of space. Helmholtz in 1870, not intimidated by the failure of the famous Italian mathematician, Beltrami, to do so, attempted to make the matter intelligible to the ordinary understanding. We may conceive, he says, creatures of only two dimensions living on a surface. If this surface were spherical they would know

nothing of straight, and if it were saddle-shaped, or pseudo-spheric, they would know nothing of parallel lines. If they developed a geometry it would be planimetry. They would really have no conception of solid bodies. Now, as these organisms or intelligences are related to ours, which live in ordinary tri-dimensional space, so he infers we may conceive our relation to beings living in extension of four dimensions. Thus it is proved that our knowledge—of space, as he then said: of the axioms, as he now says—is purely empirical.

With but two respectable exceptions, the whole subject is ridiculed by French mathematicians. In England only Clifford seems to have fairly comprehended it; but in Germany further mathematical deductions have been made, and text-books of “absolute geometry” written. The largest astronomic parallaxes have been re-measured with the greatest precautions to see if space was really “curved,” and whether triangles might not be obtained, the sum of whose angles was more or less than two right angles; and many have declared that they found by these methods a radically new way of conceiving the infinitely small and large, which revolutionizes the Newtonian conception of the universe. On the other hand, Lotze regards the whole matter as a “logical jugglery,” or a “grimace of science to intimidate the ordinary mind by useless paradoxes.” Many others no less outspoken in their condemnations might be quoted.

The chief result thus far, however, is that under the lead of the Leipzig astronomer, Professor Zöllner, the spiritualists have appropriated the notion of the fourth dimension of space, in which they argue all conceiva-

ble impossible things may be done. For a generation or two, about the only circle of believers in magnetism and spiritism in Germany has centred in Leipzig; but since the conversion of Zöllner and the partial conversion of two of his associates by the "manifestations" produced during the visit of the American "medium" Slade, who was here just after his London imprisonment, the infection has spread considerably among students and the half-cultured, well-to-do business classes. The "Harmonic Philosophy" of A. J. Davis has been translated; and one reads sketches of the author's life, sometimes published with some sort of apology, in periodicals and daily papers, one of which adds a regret that Germany is becoming "Americanized in yet another respect."

The battle has been very bitter. Some, who condemn Zöllner, accuse Helmholtz of unintentionally occasioning the movement by an indiscreet attempt to make "meta-mathematics" intelligible to scientific laymen. He has, therefore, published an open letter, addressed, I think, to Zöllner, protesting most vigorously against the utterly unwarrantable use made of his illustrations. A distinguished Berlin alienist emphasizes certain reported tendencies to insanity in Zöllner's family, and does not hesitate to diagnose Zöllner himself as insane. A young *Docent* who bought, at a shop where magicians' arts and wares are sold, Slade's famous slate-trick and others by which Zöllner declares he was converted, performs them with much skill at evening parties, where he has become in great request. Although his classes have diminished to half a dozen, Zöllner keeps up the fight, attacking, in four immense volumes within twenty months, a

score of eminent professors, including some of his own faculty, in the most bitter and personal way, and seeking at present, as he says, not so much to prove or inculcate his doctrine as to conquer for spiritualism a free and open field among great "scientific" themes. Although extravagant condemnation of Helmholtz for causing a "scientific scandal," encouraging "mathematical mysticism," "making an indiscreet appeal to the scientific imagination," was one of the many violations of collegiate decorum for which poor blind Professor Dühring was, justly enough no doubt, dismissed from his chair in Berlin, yet none of his best-abused colleagues want Zöllner dismissed, but wish him to retain his chair as a conspicuous monument of the principle, almost universal in Germany, that a professorship is for life.

Zöllner's reputation rests largely on his book "On the Nature of Comets." Here he argues, from the conditions of the stability of the aggregate state of bodies composed of fluid drops, that space must be at least infinitesimally curved, and therefore finite. All matter, even the most solid, he says, must slowly suffer volatilization if its temperature is above the absolute null point. This he illustrates by the vaporization of ice and the smell of metals and minerals. Infinite time having already elapsed, he continues, since the beginning of the world, all bodies would have vanished if space were infinite. To the argument that if the number of light and heat-diffusing bodies or fixed stars were actually infinite, the whole arch of heaven would shine, he objects that this the laws of absorption would prevent. He quite forgets that it is by no means proved that all parts of the universe are above the tem-

perature of an absolute zero, and that there are forces which act against volatilization. But this by the way.

Every one knows that spiritualism is a word of very manifold connotations. Not only are its disciples of all degrees of respectability, from the Woodhull-Claffin type up to the so-called Christian spiritualists, who, believing in the Bible and in church institutions, simply hold that Christ was the best of all mediums, and even to the large class of "Nicodemuses who are almost persuaded," although they do not break their orthodox church relations; but its doctrines and motives are no less varied. All sorts of primeval and half-outgrown yet clinging superstitions have clustered together, and warmed each other into new life under this name. Conjurers, skilful and otherwise, with a shrewd eye to business; women with shattered hysterical nerves and spoiled romantic minds; social revolutionists and even free-lusters, have made common cause with those who, with noble impulses toward a freer moral, intellectual, and religious life, boldly abandoned the narrow orthodoxies in which they were reared, yet, all untaught as they were to live without a creed, were led to a faith more mystic, a cultus more gross, than before. There is, however, at last some hope that the central mystery of spiritualism will be some time thoroughly investigated by competent scientific men. An eminent professor here, who attended the Slade séances, explained to me with much plausibility how he believed the slate-writing was done. Sleight-of-hand performances are cultivated by amateurs to an extent which threatens to dispel all the mystery of prestidigitation. Nearly all tricks which are not performed exclusively by their inventors can now be bought by those who are willing

to pay beforehand, and solemnly pledge themselves never to perform the trick until they have learned it so thoroughly as to defy detection, or even unless they can satisfy the salesman to that effect. Other elements of spiritualism are now known to belong to a distinct and typical chapter of neuro-psychal disease, and may be studied in every large hospital.

RECENT STUDIES ON HYPNOTISM.

LAST January Herr Hansen, a Danish "magnetizer" widely known throughout Germany, gave a series of public exhibitions in Breslau, which lasted several weeks, and were very largely attended. Well-known citizens came upon the platform, and, after looking fixedly at a bright glass button which they themselves held some eight inches from and just above the level of their eyes, fell more or less profoundly into the hypnotic state. The popular attention which the Slade-Zöllner scandal has so recently drawn to spiritism with its phenomena of trance and mediumship, together with the weird mysticism which is so fundamental and easily recognizable a trait of the Slavonic type of character, combined to make these exhibitions the sensation of the hour in Breslau. Many forms of superstition which seemed forgotten were warmed into life in a way now impossible in most communities farther west, until the authorities of the city and of the university invited Professor Heidenhain to press forward with investigations which he had already begun, and to follow Hansen upon the same platform, repeating and explaining in a more scientific way the experiments of the latter. Hansen cordially co-operated, and lent himself to many forms of experimentation, conforming to all

required conditions of observation so far as his engagements elsewhere would allow.

Before describing Heidenhain's experiments, it should be mentioned that the physicist Weinhold, prompted also by Hansen's performances in Chemnitz, had investigated the conditions by which an abnormal inhibition of the will could be brought about.¹ These he found, as Braid, whose work is but little known in Germany, had done, to be passes, fixation, rubbing, etc. Sometimes, when other means failed, the hypnotic condition was caused by walking the subject up, down, and around, at all arbitrary paces and angles, till he became perfectly passive to a gentle but relatively irresistible force; sometimes by a strong appeal to the imagination by means of solemn music and an array of mysterious apparatus. According to Weinhold, the hypnotic state begins in a gradual loss of taste, touch, and the sense of temperature; next colors are imperfectly distinguished; then forms grow indistinct; and then the eye is immovable, and nothing is seen. The ear never slept in his experiments. The subject believes, and at last does all that is commanded. Although not all persons can thus influence or be influenced, both powers are not specifically different from powers which all possess. The identification of these phenomena in man with those observed by Preyer in frogs, hens, etc., was an important step, and indicated that they were as susceptible of physiological explanation as is the halo of "odid" light which often seems to the subject to surround the hypnotizers, and which is a real and natural creation of the fancy of the former out of the subjective light (*Eigenlicht*) of his own eye.

¹ Hypnotische Versuche. Von Professor Adolph. F. Weinhold. Chemnitz: 1879, pp. 28.

Upon receiving a courteous invitation of Professor Heidenhain, the writer spent a week in Breslau, and witnessed the following phenomena, most of which have been more fully described by Professor Heidenhain:¹—

An officer brought in several stupid but burly soldiers from the barracks, who spoke only Polish, and, as far as could be made out afterwards, had never heard of such performances. Each one was given a loud-ticking watch to hold to his ear, and told to listen intently; while the colonel threatened them savagely if they fell asleep. In five minutes two of them were in a profound cataleptic sleep, insensitive to pain; and on being awakened ten minutes later declared they had not slept. The professor's brother, a tall, athletic, duelling medical student, the picture of health, and said to be a scholar of much promise, has been hypnotized on an average two or three times a day for two months, and scoffs at the idea of being the worse for it. The writer was invited to stroke the ball of this student's left thumb with his own forefinger as lightly as possible, and always in the same direction. Very soon the student's thumb, then the hand, then the arm and shoulder, were in a state of tetanic cramp, which passed down the right arm, then down the left leg, then the right, and then extended to the muscles of the jaw, and to those of the neck. The whole body was rigid and trembling, and the power of speech was gone. Directed by the professor, I struck the left arm rather smartly with the open palm of my hand; and the cramp

¹ Der sogenannte thierische Magnetismus: Physiologische Beobachtungen von Dr. Rudolf Heidenhain, ord. Prof. der Physiol. und Director des physiologischen Instituts zu Breslau. Vierte vermehrte Auflage. Leipzig: 1890. Translated into English by L. C. Wooldridge (Kegan, Paul: 1890).

instantly vanished. His brother started as from a sleep, looked confusedly around him a moment, then seemed to recover consciousness, and, remarking that he had had rather a strong dose, walked across the room, and drank a glass of beer.

A constant touch on the back of the neck between the first and second vertebræ makes some perfect imitative machines. Every motion, look, word, inflection, of the person on whom the attention is fixed, is exactly imitated; a long English sentence, e.g., with extreme and grotesque inflections, was repeated almost perfectly in every detail by an old workman in the hospital. The instant the finger is removed from the neck, the repetition stops, often in the middle of a word.

Nor is this the strangest. With a number of his subjects Professor Heidenhain and his colleagues are able to hypnotize one-half of the brain and body; the other half remaining normal. One half the face smiles; and the other remains in the familiar immobile, waxy, catâleptic state. One arm and leg can be moved at will; the other, not. One eye sees distinctly, and the other imperfectly or not at all. When the right side is hypnotized, aphasia is produced; but *not*, or only exceptionally, when the left side is affected. This is, of course, in accordance with pathological observations, which locate the speech-centre in or near the left cerebral convolution, and with the anatomical fact that most of the so-called pyramidal or volitional fibres cross soon after leaving the brain. If the person thus affected be told to make some simple motion with the finger of the normal side, e.g., to rotate the thumb about the other, and to continue the motion without cessation or interruption while observing another rotate his own thumb

now in one, now in the other direction, — a task easy enough in the normal condition, — the half-hypnotized person, though believing himself in the full possession of his faculties, finds this impossible. He *must* stop every time that the experimenter changes, and generally reverse the motion for an instant, in spite of all his efforts to the contrary, but is immediately able to correct the error, and go on as directed. This is almost invariably observed, and is explained by supposing that one-half of the brain, being reduced to the condition of an imitating automaton, is mechanically compelled by the retinal impressions to repeat the motion as seen, and that the normal half must arrest this impulse by a special act of volition later.

Even one eye alone may be hypnotized; in which case color-blindness is caused. Professor Cohn of Breslau has made these phenomena an object of special investigation, and has used not only Seebeck's worsted patterns, but Hirschberg's ingenious method of detecting simulants by the crossing of perpendicular colored lines seen stereoscopically, and even Stilling's yet more confusing tables for detecting and measuring the degree of color-blindness; but without discovering any traces of feigning. An hypnotized eye which has gazed for a moment at brilliant-colored figures which seem only variously-shaded gray, when the colors are removed and the eye suddenly awakened, sees the complementary after-image of the colors which it has never perceived. The fact that slightly warming the eyeball, by pressing it gently with fingers which have just been vigorously rubbed, speedily restores the power to perceive colors, indicates that the circulation of the blood in the retina is affected; while the fact that atropine

removes this induced color-blindness, or makes it impossible, may perhaps indicate that it is in some way connected with the cramp of the ciliary muscle. The facts thus far observed in this line are generally thought to be irreconcilable with Helmholtz's theory of three fundamental colors, but to be more or less explicable upon the hypothesis of Hering.

With earlier hypnotizers, "mesmerizers," or "magnetizers," these experiments were successful, almost without exception, with women only. Professor Heidenhain's observations have been entirely on men, and have succeeded with about one student in twelve. With all the first time is the hardest; and, while many grow so sensitive that a very slight influence makes them immediately unconscious, others after a while grow unsusceptible again, and finally lose entirely the power of being affected. Some acquire the faculty of hypnotizing themselves; and others, when told to remember that at a certain hour they are requested or influenced to sleep, do so without any of the ordinary means, and without even the presence of another person. Hallucinations are readily caused if a few verbal hints are given. With some subjects, fibrilar twitches in various muscles, accompanied by other symptoms of increased excitability of the spinal and medullary centres, follow the experiments, which in such cases are always discontinued. Rheumatic patients often make movements with their limbs which seem impossible in their ordinary state. Far-sighted persons always see much nearer than usual. Cramp of the muscles of accommodation is caused in others, so intense that they can read type of almost invisible fineness at a distance of an inch or less from the anterior surface of the

cornea. The handwriting in this condition is extremely bad ; and some patients, under certain conditions, begin at once to write backward. Heidenhain believes that the blood-vessels of the affected side are expanded, and that a new method of localizing the functions of the brain may be developed from the effects of varying local irritations. As a general rule, with many exceptions, anæmic persons were found to be most easily affected.

A new conception of these phenomena has more recently been developed by Professor Berger, a colleague of Heidenhain, who lays chief weight upon the "psychologic moment of conception [*Vorstellung*] and attention.' ¹ He observed that when the tongue was stroked from the root toward the tip, it was thrust outward. If the stroking was in the reverse or transverse direction, the movement of the tongue was the same. If the finger was placed on the outer angle of the eye, and the skin gently stroked toward the temple, upward, downward, or toward the root of the nose, both eyes were turned in the direction of the stroking. By operating thus on both eyes at the same time, but in different directions, the optic axis can be made to diverge ; and in a single case one eye was turned upward, and the other downward. If the stroking was persisted in, in the same direction, it often happened that the face and finally the whole body turned toward the same side as the eyeball. So, too, the eyeball and eventually the body of the hypnotized patient was turned in the direction of a noise. Artificial dreams and hallucinations, in some cases even of taste and

¹ See Breslauer ärztliche Zeitschrift, 1880. Nos. 10, 11, and 12. Hypnotische Zustände und ihre Genesis. Von Professor O. Berger.

smell, were evoked in more than twenty individuals. These were observed to arise spontaneously only in a few cases, and in these their duration was very brief. Some slight suggestion was generally necessary. Musical sounds suggest all the details of a concert, which is described and apparently heard with much minuteness of detail. A slight tap or shake suggests a fight, and evokes plastic, mimetic gestures. If the hands are folded, the patient believes himself in church and perhaps at prayer. When salt-water is tasted, and the patient is told it is beer, he complains that it is sour; if told that it is coffee, he declares it tastes of grounds. All this while the skin is somewhat anæsthetic with more or less anæsthesia. The patient distinguishes painful and pleasurable feelings more readily than the more specific qualities of sensation.

Berger believes that the sensory irritation which Heidenhain regards as the chief genetic moment is only a means to an end, and that the cause of these states and phenomena is essentially psychic. If the attention is diverted, the manipulations are of no effect, while the chief aim of the hypnotizer must be to direct and localize the imagination consciously or unconsciously. Every specific group of movements which have been well compacted by associations can be stimulated or inhibited by any means which command and control the attention. In answer to the objection that these conditions can be caused during cataleptic sleep, Berger urges that in sleep, dermal irritations are still effective, and reminds us that the *Vorstellung* can cause many similar somatic effects which the will cannot. A so-called *medium* in an honest trance does not become cataleptic, although the

dermal irritation and the central excitability are about the same as that of an ordinary hypnotic patient, because the reflex action does not result in an entire inhibition or laming of the will.

The different results obtained from different persons are due to difference of conception or imagination. Berger's conclusions then coincide mainly with those of the commission which reported to the French Academy; and the prospect of obtaining exact scientific explanations of these phenomena seems indefinitely postponed. At the same time much good must result for the pathology and physiology of the nervous system. Attention is drawn to the therapeutic value of the "neural treatment," and to the necessity of making it methodic. If a morbid direction of the imagination can cause disease, the reverse may aid in curing it. Nervous sleeplessness, certain forms of croup, hystero-epilepsy, etc., are real diseases, however much the imagination may be implicated in their symptom-complex; these, Berger believes, he has helped or cured by hypnotism psychically caused. Concomitant changes in the condition of the walls of the cerebral and spinal blood-vessels, causing local modification of temperature, are also likely to be demonstrated; and it seems more probable that these changes may be more or less brought under the category of reflex action.

The latest contribution to this subject is from Herr Schneider, a teacher of zoölogy, at present Professor Haeckel's assistant,¹ who has written suggestive pamphlets on *The Sensation of Rest*, and *Distinguishing*, as well as a more comprehensive treatise on *The Animal*

¹ Die psychologische Ursache der hypnotischen Erscheinungen. Von G. H. Schneider. Pp. 79. Leipzig, 1890.

Will. The author is ingenious though not always exact or lucid. He attempts to explain hypnotism according to the fundamental conceptions to the development of which his writings are devoted. Consciousness, he thinks, begins when a rudimentary animal "distinguishes" by re-acting differently upon different impressions. First conditions and then things are thus distinguished, and different centres soon begin to act independently. Even the lower reflex centres distinguish, and are therefore, in a rudimentary sense, conscious. Most, if not all, sensations exert (and perhaps exist as) "instinctive" motor impulses which may or may not be strong and concentrated enough to result in actual motion. Knowledge and will are of course more developed forms of sensori-motor processes, and like them adaptive. It is a law of normal consciousness that the reproduction of any sensations or perceptions can have no greater effect than their production had. But consciousness is normal only when different impressions are acting upon it at the same time, from different directions and of different species, each modifying, complementing, but above all inhibiting the natural impulse of motor re-actions of the others. Hence the most rational actions can result only from the best and most manifold combinations of all these elements of consciousness. High degrees of this all-sidedness are rare even in the most healthy or the greatest men. Feeling, passion, and particularly attention, which when concentrated eliminates the effects of larger tracts of sensory activity from consciousness, limit normal broad irradiations and conductivity within the higher nerve-centres. This abnormal extreme one-sidedness of consciousness is the explanation alike of love and jealousy

and of somnambulism or hypnotic automatism. Impressions made upon the skin and muscles, if restricted to their own immediate reflex effects and intensified by narrowing down the broad current of consciousness to this nervous arc alone, cause insensibility, stiffness, and cramps. Visual sensations under corresponding conditions cause imitative movements, and auditory impressions give rise to vocal reproductions, obedience to commands, dreams, etc. These three forms of re-action correspond to Herr Schneider's three forms of instinct.

These abnormal phenomena were hitherto less familiar in Germany than in France, England, or the United States; and, although science is baffled for the present in its search for exact results, it is of no slight importance that the causes and conditions of these states are now better understood than even by Braid. The phenomena of "trance and mediumship" are again demonstrated to consist in abnormal nervous states which any tyro can more or less control. Practical methods of treating certain forms of nervous diseases are already being modified by these results. Pathological classifications and laboratory themes prepared for physiological investigations of nervous functions are likely to be affected, while psychology receives not only a valuable budget of suggestions and *aperçus*, but is strongly encouraged and confirmed in the fundamental assumption of psycho-physics that many of the secrets of the soul are somehow bound up in those of the nervous system.¹

¹ For two interesting popular sketches see, R. Gescheidlen. Die Erscheinungen des sogenannten thierischen Magnetismus im Lichte der Naturwissenschaft, in the Augsburger Allgemeine Zeitung. Nos. 3, 4, and 5. 1880. A. R. Rühlmann. Die Experimente mit dem sogenannten thierischen Magnetismus, in Dem Gartenlaube. Nos. 8 and 9. 1880.

POPULAR SCIENCE IN GERMANY.

THE distinction which Virchow insisted upon, in his famous München address, between what is to be taught and what is to be sought for, is one long observed by the most scientific German minds. Nothing is more surprising, in coming into more or less intimate personal relations with these men, than to discover in some confidential hour a system of individual conjectures respecting general and ulterior questions of human knowledge, cherished with an enthusiasm which perhaps has long animated all their researches, but which, out of reverence for scientific methods which they have long felt with Virchow enjoin a "certain moderation and renunciation of merely personal opinion," have never found public expression. These constitute what Lotze regards as philosophy when he defines it as merely the individual expression of general culture. "The prospect of later bringing to bear the experiences and results of a life of scientific labor upon my cherished but perhaps worthless reserve-thoughts" (*Hintergedanken*), said a young professor the other day, "makes the prospect of old age seem charming in a sense that Cicero could never know." These unfinished and private speculations find expression in Germany, not, as formerly, in more or less developed philosophical systems, but in the increasing

literature of popular science. The latter here is not, as so often in England and America, a narration of curious facts illustrated by a dexterous use of chalk, by cartoons, and by an array of laboratory furniture, but, despite the general reticence of the best minds, is not unfrequently a discussion of the most general inferences and hypotheses, and that with a freedom which Puritanism still makes impossible in America, and with a frankness and unreserve which is later often regretted.

An admirable illustration of this may be found in the writings of Professor Philip Spiller, who died last week at the age of eighty, and whose life was devoted to the study and teaching of natural science. His amazing industry, his wide reading, the fecundity and rapidity of thought shown in his works, have long made him, as a German review styles him, "one of the heroes of the popular scientific mind." In three large volumes he has elaborated a system which he terms "Etherism," and which may be fundamentally characterized as follows: The essence of all life is motion: consciousness is best conceived as the movement of atoms and molecules in brain-cells, with the inevitable accompaniment of heat-products, electric currents, etc., as in molar motions. Hence the present tyrannical fashion of dualism is denounced as the product of shallow or timid thinking. The soul is neither supernatural nor transcendent, and thought itself is a phenomenon to be one day fully explained by the chemico-physical-mathematics of atomic oscillations. Not merely is the human body a "kinetic organization of ether," but the cosmos itself is made out of, and will later, by inevitable mechanical laws, be resolved

back again into, ether, which is the "mother-lye" of the universe. Light is the magnetic polarization of ether, more or less perfect according to the color. An average human brain, he conjectures, contains about twelve hundred millions of cells, to each of which is attached, on an average, four fibres. If the number of notions which make up the contents of a given brain be taken as one hundred thousand, each will have twelve thousand cells and forty-eight thousand fibres as its province. In "instinctive moments," when the outer world is forgotten, and we drift aimlessly and unconsciously in thought, then it is that the "primeval force of the world, the absolute universal will, is at the helm, and its larger logic of etherical vibrations is undisturbed by intruding sense-perceptions." All men think according to the same laws of thought, because the laws of elemental motion are uniform. This antique and often violently anti-Christian pantheism is gorgeously attired with unusual graces of style, and with so many facts of modern science as to present much verisimilitude to the uncritical and unscientific reader. A popular journal speaks of Spiller's "amazing synthetic power" as a "great joy and wonder in this time of dissolution and speculation." Another, after quoting Hegel's saying that "a thinking man cannot think too highly of himself," calls Professor Spiller's system "the culmination point of modern thought, where the thinking mind celebrates its highest triumph." His work is elsewhere spoken of as a "most original and optimistic cosmology, in spite of its atheism and materialism." Even the well-known critic, Karl Müller, dubs the author the Lessing of natural science.

Another still more amusing dreamery of popular science may be seen in several articles published within the last few weeks by Professor Jäger, of Stuttgart, and entitled "The Discovery of the Soul." The soul, according to this naturalist, is simply (*honi soit qui mal y pense*) a smell, and consists of a "chemical composition of albumen" called *nervina*. Liver, kidneys, muscle, brain, each emit a peculiar odor, which the writer's olfactory nerves readily distinguish. Each of these organs has thus its own soul, and, collectively, they constitute an aura which may rise above the threshold of consciousness, and even become offensive, as in animals and in negroes, but which more commonly is a very efficient and unconscious agent mediating the instinctive attractions and antipathies of temperaments and sexes. Thus small children recognize their parents. Not only hunger, but joy, love, hate, and pain, emit their own peculiar odors. In people of sanguine temperament the "soul-stuff" is most loosely bound with albumen, in choleric people more firmly. Moses discovered the scientific fact that there is a soul in the blood; Oken, that the soul, like all else in the animal body, was in the cell; but Professor Jäger claims priority in showing indubitably, "by a long series of scientific observations," just *what* the soul is. We commend this important discovery to novelists of the intuitive school. The likes and dislikes of the heroes and heroines of "Counterparts," e.g., is no longer a riddle or a myth. Platonic love is not platonic, and is not love, but a more or less unconscious titillation of the olfactory nerves, or perhaps of the pigment-cells of the Schneiderian membrane.

It would be very easy to make quite an anthology of

curious theories recently propounded by eminent scholars in their more exoteric but serious utterances. These have all degrees of respectability, — from the harmless notion attributed to the astronomer Salle that each of the planets is inhabited by beings intelligent in proportion to its age, and that thus we may expect some day to receive visits from the superior beings of some venerable world, who have solved the problem of ethereal navigation; to that of Professor Zöllner, in Leipzig, who has become the dupe, and to some extent the propagandist, of spiritualism. Popular science has even found its way into the university. Du Bois-Reymond explains to weekly audiences of over a thousand students his own peculiar theories of the composition of molecular forces and of electrical action in contractile animal tissues. He insists that a relapse of the world into barbarism, or a return of the dark ages, is now rendered forever impossible, only by the development of technical and mechanical science; yet opposes the admission of graduates of the *real*-schools into the university on equal terms with the gymnasiasts, and raises a vigorous protest against incoming “Americanisms.” By this term he designates materialistic and “banausic” tendencies in general, which are more specifically expressed in making money-getting the prime object of life, in love of display, and in public and private corruption. With this he contrasts “Hellenism,” or the love of humanistic and scientific culture for its own sake, apart from all considerations of profit or advantage. This, he thinks, should be made the German idea.

The most popular theme of popular science in Germany, as elsewhere, is evolution: it is such a portable

and convenient theory, especially where it is imperfectly understood. It solves every problem, satisfies every doubt, and puts the key of the universe into everybody's vest-pocket. The very phonetic elements of the word *Entwicklung* were recently described by a humorous writer as fitting and filling the average vocal organs more completely than any other known combination of sounds. It is said that several privy councillors have argued before the Ministry that the influence of the notion of a gradual and ascending order in the universe would eventually prove a most wholesome panacea for Social-Democracy, and against the noxious levelling French maxim of liberty and equality. Others have attributed to popular science most of the evils of socialism. Haeckel, undismayed by Virchow's strictures, continues, more vigorously perhaps than ever before, to insist that the truest bond of union between facts is not a plain straight line connecting them, but the most beautiful curves that human ingenuity can draw through and between them. In a popular lecture delivered in Vienna, and just published, Haeckel goes further than ever before in maintaining that the facts upon which evolution rests have now rendered every dualistic notion forever impossible. Atom-soul, plastidul-soul, cell-soul, and so on in genetic order, he considers as established facts. All living matter is besouled; and these elements are not stones in a building, but citizens of a state. The simplest molecule of protoplasm must be considered as endowed with sensations and motions; the first consisting of pleasure and pain, the last of attraction and repulsion. The majority of the younger generation of scientific men in Germany are unquestionably in sym-

pathy with him ; while it is mostly the older men who applaud the *ignorabimus* creed of Reymond, and consider Haeckel's genealogy of species scarcely more credible than is the pedigree of the Homeric heroes to the historic critic. Haeckel postulates, defines, and christens with Greek names, half a score of more or less new sciences to fill the gaps in the evolutionary scheme, viz. : the culture history of animals, or the development of instinct ; the genesis of physiological functions ; the science of rudimentary organs ; the distribution of animal-life in time and space ; retrogressive and abnormal development ; the science of ideal ground-forms and types ; the genesis of the social, moral life ; and finally the instincts of natural religion, — out of the inevitable association and division of labor as found not so much among primitive mankind as among the simpler forms of animal life. He now has less to say in favor of introducing theories of evolution into the schools.

In regard to the whole bitter controversy, the sensible middle thought among scientific men now seems to be that the issue between Professor Virchow and his enthusiastic pupil was far less broad and important than the religious and, in part, the conservative press have represented. Haeckel is not a "nihilistic yet superstitious prophet of a new religion." He has never affirmed that "the true domain of faith is science and not religion ;" nor, on the other hand, is there any danger, as Virchow fears, that science will be generally discredited by such harmless speculations. Neither is it true that the question of the descent of man is a question so great, and on which so few facts have thus far been collected, that it is not yet even ripe

for logical or profitable discussion. It is not a dogma, but a problem ; although it is not easy to determine how much is meant by the vague exhortation to a "rational resignation, renunciation, and moderation." The question is largely speculative, and as such ought long to remain more or less esoteric. Virchow, in his own way, is no less evolutionist than Haeckel in his ; and the real question between them is only one of method and policy.

A NOTE ON HEGEL, HIS FOLLOWERS AND CRITICS.

WE question whether Hegel himself would have been able to account for the rise of an Hegelian school in America, an event which has transpired in contradiction to the fundamental principles laid down in his history of philosophy. The circumstances of its origin also in a city like St. Louis, from a native German who deigns to publish nothing himself, and whose disciples are with few exceptions outside of academic circles, have often suggested the question whether the movement rested upon any thing deeper than love of paradox, affectation, and sentimentality. This view of the case seemed strengthened by the circumstance that few of our Hegelians have had a thorough training in the history of philosophy, or even in the German language, from which only a few of Hegel's works have yet been translated. However it may have been at first, this surmise is becoming every day more and more unjust. Hegelism in America is not only beyond the reach of ridicule, but beyond the need of patronage or forbearance by those who feel that a mistaken philosophy is better than none here; while a very few of those who profess its leading tenets here exert a great and on the whole beneficent influence upon our philosophic thinking, al-

though with but one or two exceptions its disciples are men of much less culture than English Hegelians.

Again, with many, the fact that Hegelism is dead in the land of its origin, having since the death of Rosenkranz no true representation in any of the universities, where once its adherents were counted by the score, has had great weight against it. Hegel's sun rises in America after it has set upon the Fatherland. We are gathering up the old cast-off clothes of others intellectually above us, it is said. This fact also, for a thinker who does not hold belief as a matter of authority or fashion, can have little weight in itself. It should, however, prompt a most diligent inquiry whether Hegelism in Germany was simply ignored or neglected because external circumstances diverted men's minds to other things, or whether it fell in a fair and open field, because it was weak and unsound, and its adversary was essentially stronger. That the latter was the case, we shall attempt on a future occasion to make plain. Indeed, it was this historical status of Hegelism that first weakened its hold upon the writer's mind.

Again, the mind must have ideal objects. If these are not presented to it in some congenial form, it creates them for itself, either as myths or more frequently now and here as original though crass speculations concerning society, the state, the church, the universe, etc. Those who are acquainted in the western part of our own country can testify how common this squatter-sovereignty of opinion is among active-minded men, who, from local isolation and lack of instruction, are remote from the great historic currents of philosophic thought. Their creed comprises and explains the universe, so far as they have ever felt the need of an ex-

planation. The latter is purely personal and individual, and hence their complacency in it, their impatience of contradiction, their uneasiness if another contemporary chance to have arrived at the same results, as if it were trespass upon their own domain, while at the same time they are pleased to be told that thinkers of the past have come to similar conclusions. The natural reactions from a severely practical and business life make it often an amusement for a man of our peculiar neurological temperament to be his own philosopher; and because he is surrounded, more in America than elsewhere, by extremely impressive illustrations of the power of the mind over nature, because here the inference is not merely congenial, but to a certain extent, spontaneous and irresistible, that thought is creative, and that man is the maker of his world, his philosophy is very often, even when he fancies it otherwise, highly idealistic. The rapidity, certainty and greatness of changes of all sorts for and about himself is another, and perhaps the strongest of all motives for seeking abiding principles in nature and in humanity. In fact, all our institutions rest upon and point to a psychological foundation in a peculiar sense; while on the other hand, as a nation, philosophy is in a backward state here, partly at least because we have persisted in working out our own problems in our own way, without much reference to the history of thought elsewhere or in the more remote past.

But at the same time youth is receptive and plastic; and nothing is of greater psychologic interest than the strong up-gush of strange feelings, desires, longings, which make the world seem so new and unreal at first, which are understood only after years of introspection

and observation of others, and the proper control of which is one of the highest and most important lessons of life, — those feelings, namely, which herald the advent of adolescent maturity in young men and women, and which always inclines to some form of romanticism. The theory of conversion, or a change of heart, seems to have been developed from the need, more or less consciously felt, to utilize, formulate, and regulate this great epoch, when man receives, as it were, his capital of energy and altruistic impulse for life. Now, we have heard Hegelism coarsely and vulgarly dubbed in Germany the “puberty-philosophy,” not perhaps primarily because it was assumed to meet a physiological need so much as because the pleasing, dizzy sense of liberty inspired by the perpetual recurrence of vast dialectic alternatives, when every thing is an open question, and even in Hegel’s familiar words, “All progress is advancement in the consciousness of freedom,” as if the universe itself might be comprehended and solved by mastering a few thousand pages, was assumed to be the most admirable and characteristic sense of incipient virility. The creeds of childhood lose their definiteness, and are resolved into moments of absolute thought. All conventionalities, and ideal institutions of society, church, state, family, schools, duty, etc., cease to exist merely and alone as brute material facts, and become clothes which the mind has made for itself rather than integuments which cannot be put off without vital lesion. This sense of universal “explanatory solvency” is simply intellectual maturity, — the natural emancipation which vigorous and fully-developed manhood is pretty sure to bring of itself, unless the hinderances and ligatures of dogmatism are too many and strong. This

function of Hegelism we consider as most salutary, and its advent as most natural. Indeed, subjected to psychological tests, as all systems of philosophy must eventually be, perhaps no intellectual system is more thoroughly wholesome from this standpoint. This, too, perhaps explains also in part the priestly and almost religious aspect it so often assumes. Its expositors always have esoteric insights which hardly the most docile pupils can fully share, and to which they always take refuge if controversy, which is commonly shunned, is urged upon them. "Ah! you have never grasped the fulness of his meaning, you are on too low a plane, are no real philosopher, have not the true Hegelian *daimonian*, have not reached the pure entelechy of being-for-itself," etc., were the common utterances of the most venerable of living Hegelians in the Berlin Club, not only when the great master's doctrines were assailed, but even when other Hegelians attempted to expound him. The appeal to intuitions so profound can be only in hints. At best Hegelism can be apprehended only by *aperçus*, and those who try to explain its bottom secrets have not got it.

But, for most who have espoused it in Germany, Hegelism has been transitional. It has been an excellent *Vorfrucht* to prepare the philosophic soil for other theories. It limbers and exercises without fevering the mind, and makes a safe and easy transition from the more saturated orthodoxies to other standpoints. Even its adversaries admit that as a mental discipline at a certain stage of philosophic culture, it is unsurpassed. Two things are certain,—first, that almost all strong young men in Germany who have espoused Hegelism have either outgrown it, or become sterile in

thought, however much they may have written about and about it; and secondly, no one ever came into close quarters with Hegel without undergoing great mental change, however soon he may have been discarded. Some acquire great verbal subtilty, acuteness, and fluency, and a habit of astonishingly skilful, scholastic, dialectic thrusting and parrying. Others come to find in evolution a sort of new messianic dispensation of Hegelism. This in Germany has been amply illustrated in the history of the so-called *Naturphilosophie*. Some get an impulse toward Tübingen; but most now who are not trained in science assume the characteristic dogmatism toward it, and are drawn toward Rome, not of course, as an absolute authority, but as the most imposing and elaborate of all the ideal institutions erected out of the deposit of ages of thought, and as therefore the consummate creation of the reason of races and generations as contrasted with that of the individual.

The fusing of Hegelism with the residual elements of New-England transcendentalism is the most important event of its history in our country thus far. It has far more nerve and vitality in it than the latter, which has opened up a field for it; and at present it seems as if its effects were mainly to be felt here in the domain of religious thought, where they should be peculiarly salutary in ultimately opening anew the fundamental problems of belief now so generally ignored by religious teachers, in softening the asperities of dogmas, in sapping the issues between the sects, and perhaps eventually — so at least we read its tendencies — in mediating a platonizing conservative movement toward and within the church. So far, at any rate, it is profoundly theistic, if nothing more.

Without attempting to enter radically into the matter here, we shall content ourselves with stating briefly two objections against the Hegelian logic which have much weight and interest with us. We cannot help believing in the reality of pure thought, Hegel argues, in the *Encyclopædia*, no matter how thoroughly we may have schooled ourselves in the Cartesian scepticism. The *will* to think purely is all that is required of the beginner at the outset of the logic. Though it prove itself identical with being, pure thought is always the logical *prius*. Because it is first, and because, as any logical beginning must be, it is immediate, it is best represented as objective—as something given, to be observed or *speculated*, rather than controlled or comprehended. Here, as being and as essence, it is the most real of all realities; in short, it is substance itself, in its most self-subsistent nature.

In the logic of notion, pure thought becomes its own equipollent subject, constituting the world in which consciousness lives and moves, and hence is the most ideal of all ideas—now not merely metaphysical, but transcendent. It is pure thought which is latent and determining,—abstract, in Hegel's sense,—through all the stages of the *Phenomenology*, and which becomes articulate and explicit in the *Logic*. Thus, as the Neo-Platonists said of the relation between the Old and New Testaments, so we may say of the *Phenomenology* and the *Logic*: In the first the last lies concealed; in the last the first stands revealed.

There is no *jenseits* to the logician who has reached the perfect *entelecheia* of *für sich*. The picture is the curtain which seemed to hide it. Pure thought, then, which seemed so easy because it is so spontaneous and

inevitable, proves in the end infinitely hard, because, as Michelet explains, not only are all the phenomenal stages of consciousness presupposed, but because the universal whole of thought is involved by the severest logical necessity in its simplest act. Pure thought, then, is not so much a dominant category in Hegel's system as the warp, which does not in itself contribute to form or color, although *through* it all the categories are woven with harmonious and determinate sequence into ideal patterns of things.

Does Hegel's system require us to conceive of thought as pure in an improbable or impossible sense? This has been a central question in all Hegelian discussions. It seems evident that "a presuppositionless beginning does not require us to forego the use of concrete predicates," or "metaphors of sense and understanding," in characterizing it, nor forbid us to recognize any of the previous determinations of thought as we proceed. Indeed, perhaps it is more necessary for the dialectic than for the deductive method, that it pause and verify at every step. Even Rosenkranz insists that the logic needs modifications because this was not sufficiently done by Hegel. Indeed, this is necessary, not merely for the didactic success of any system, but it is perhaps the highest philosophic motive; for no speculation was ever truly satisfying to the philosophical impulse, or even very convincing as a mere act of first intellection, before it was brought into manifold and harmonious relations to common thought and things. But, on the other hand, if what claims to be a pure geometry of thought is found to be merely description of particular objects of thought,—if *idola fori*, or the Zeitgeist, or empirical science, are found to have furnished centres

about which thought has accreted, instead of crystalizing into its own free forms, — then it is impure, in a sense fatal to many cherished results of Hegelism.

Space, in Hegel's system, is derived only in the philosophy of nature as the first result of the creative resolve of the absolute idea in its pure freedom to become objective to itself. It is thus the other-being of spirit, the external as such, and in itself, without further determination. While later, space and time, by their own imminent dialectic, become, as sublated, matter. Before this, quantity and measure, and even attraction, repulsion, and mechanism, are all characterized in the logic as non-spacial. It is evident, without discussion, that Hegel is no mathematician, and that this description of the origin of space is inadequate to the most important of all logical transitions, viz., from the subjective-intensive to the objective-extensive. This will at least be admitted by those who realize the complexities in which this, the central question of recent psychology, is involved.

Pure vacuous space — is it something, or nothing? We may even say that this is at the same time a real and a logical question. Substituting the word "space," first, for "being," then again for "nothing," in the large logic, we have, without a single change in the phraseology or illustration, a discussion of the above question. Like being, space is undetermined; like only to itself, cannot be known by means of any determination or content which can be distinguished in it, or out of it. It is, in short, nothing which sense or understanding can apprehend. It is perfect emptiness, or self-determination, and thus neither more nor less than nothing; though we cannot add of space, as

Hegel does of being=nothing, that it is empty perception or thought itself. This, especially if we were to accept Werder's interpretation that nothing is, as it were, the memory of the vanished being, and, therefore, something additional to it, simply shows how sublimated and impossible is the thought here postulated. Will it be said that space is merely an illustration of pure being? If so, as the above are all the attributes of being and nothing, and as they belong to space, have we not a perfect identity? Where are the *differentia*?

The grounds upon which space is identified with being are far more logical than those by which thought and being are identified. Hegel's reasoning may be put as follows: Pure being is indeterminate, simple, immediate. Pure thought is indeterminate, simple, immediate. Therefore, thought is being. This violates two principles of logic. Two negative premises are made to yield a conclusion; and, secondly, that conclusion is positive when it should be negative, because the syllogism is in the second figure. In other words, Hegel starts with two *tabulæ rasæ*; and, because they are alike in being *rasæ*, he infers that the two *tabulæ* are identical. While we insist that there is but one conceivable *tabula* which is absolutely *rasa* in the universe, and that that is simply space, which thought tries to apprehend—now positively, as a condition and *prius* of all things; now negatively, as the absence of all content or determination.

When we remember how the Eleatics denied the existence of not-being, or, as we should say, failing to see the dialectic nature of the notion of space, made it more real than its content; or how the Vedic consciousness, abstracting all sensuous content, hyposta-

tized emotional factors as its content of unlimited potentiality, the great merit of Hegel's characterization must be admitted. We prefer to stand, however, with C. H. Weise, who, in his metaphysics, breaks with Hegelism by arguing that every thing that is real and necessary must submit to the categories of space.

If Hegel's being were the mere infinitive of the copula *is*, as Erdmann thought, not only would whatever copulative force it might retain still presuppose two terms to be connected, but it is impossible to empty the word of all notion of existence. Of course, the phrase *nothing is* must be purely negative here. The *is* has no shadow of substantive quality about it. It has manifestly even less meaning than in such a phrase as "abracadabra," which has no sort of existence, "is." The predicate of the phrase *being is*, on the other hand, has, in spite of us, a positive substantive meaning. In characterizing or thinking *being*, we cannot escape the subtle connotations of the predicative verb; while, in thinking *nothing*, all reference to even its copulative function is, by hypothesis, excluded. We cannot escape the conviction, that, though no doubt Hegel understood this distinction well enough, he has unconsciously *punned* upon two words which really have nothing in common except form and grammatical function.

Again, we may substitute for being and nothing, in the Hegelian equation, space with any homogeneous content, and it "solves and proves" quite as well; for instance, ether, — Lucretian atoms uniformly and infinitely diffused, undifferentiated nebula, — any thing which will serve as a background for the cogitable universe, even if it be so only in terms of sight and touch,

it does quite as well. Are, then, intension and extension convertible terms instead of dialectic opposites, or have we here only an artificial abstraction from sensation? Hegel is fond of showing us that no more could be seen in pure unbroken light than in darkness; but how shall we explain his denunciation of Newton as a barbarian, who might as well have said water was made of seven kinds of dirt, as light of seven colors? Surely it was not because Newton had marred a mere metaphor of the Hegelian logic.

Leibnitz was the first to say that all science that could be *proven* must be referred to spacial intuitions. Schopenhauer has shown that many qualitative relations of thought may be best expressed diagrammatically. J. H. Fichte argues that space depends on a peculiar feeling of extension "inseparable from self-consciousness, and grounded in the objective nature of the soul." The mechanical logic of Boole, and even that of Ueberweg, are founded upon the idea that as inference becomes certain it is best formulated by quantitative symbols. F. A. Lange, however, has attempted to show at some length, that, after excluding modality, a spacial formularization in thought is always necessary when we would assign a general validity to any particular logical form. Thus, all the true may be best distinguished from all the fallacious forms of the possible syllogism by means of the spacial inclusion or exclusion of circles. Although syntactical forms furnish the most striking and suggestive illustrations of the innateness of these spacial determinations, was it not upon such geometrical references, far more than upon grammatical relations, that even Aristotle was led to infer the apodictic nature of syllogistic reasoning?

One interpretation of pure being makes it the same as the simplest psychic process. This is precisely what Hegel attempts to describe at the beginning of the *Phenomenology*. "Mere being," we are there told, "is an immediate delivery of sensuous certainty; but, as the first object of consciousness, it is identical with the abstract *now* and *here*." This is precisely the view of recent psychology, and accords with the verdict of perhaps most post-Hegelian speculation. "Thought," says Ueberweg, "must be free from the compulsions of experience, but not void of experience." "Thought without presupposition," argues Ulrici, "reverses the possibility of things." "Pure abstraction," says Schelling, "must always presuppose that from which abstraction is made." "Reason," says Schopenhauer, "is of feminine nature. She can give only what she has received. Her conceptions are never immaculate." "No concept-form" (*Begriff*), Hodgson urges, "can ever grasp the infinite, but can only reach the conviction that there is something beyond its power to grasp; and this something we call ontological, because, and so far as, we feel that thought does *not* correspond to things." In other words, intension, as divorced from extension, is inconceivable. Schleiermacher's argument is, that dialectic reason must always rest upon the double basis of inner and of outer perception; and Kuno Fischer, in his Hegelian period, understood Hegel to mean that the shadows of earlier perceptions might enter and determine the dialectic process.

Our conclusion, then, is, not perhaps that pure thought is demonstrably unknowable or unreal, but only that it was as unknown to Hegel as it is to the rest of us thus far; that what he has characterized is

neither single, immediate, nor extraneously undetermined. The fact that the Idomedian eye—which Reid supposed to exist by itself, and to perceive the world as it would look if sight were absolutely uninstructed by experience or by the sense of touch—was unreal, does not forever disprove the possibility of something that we may poetize about as pure vision. If we close the eye, we have a dim sense of spacial extension, over which the retinal darkness is spread,—somewhat as Hegel assumes, the mind, emptied of all the products of sensation, has a consciousness of being and nothing; but the one feeling as well as the other is a mere residuum of experience, and not the undifferentiated substance out of which experience is made. If color had no objective ground, but were, as Schopenhauer argues, only a physiological phenomenon, dependent for hue on greater or less quantitative activity of the retina, and for intensity on the amount of its undivided residual energy, then we should have something in the world at least analogous to Hegel's pure logic of quality. But even this latter is far more demonstrable.

Pure thought, then, in the sense required by Hegelism, we regard as a postulate, or rather an hypothesis, of logic, and not as an established verity, and still less as demonstrably identical with being.

But even this is not the greatest difficulty with the first triad. Thus far all is static, motionless. Pure being is as seductive to the rest-seeking reason as *Nirvana* to a world-sick soul. But where comes the vital, moving, evolving principle? Such random categories as matter, space, substance, being, are members of a very different order from such as cause, force, becoming, and the like. Whether because these last are

based upon time, as the first upon space, we will not here pause to ask. However this may be, it is certain that *esse* and *feri*, *stasis* and *dynamis*, are, as it were, the two poles of all thinking. Whence, then, comes the last? Logic, at length, has come to adequately recognize Leibnitz's dynamic negative as a universal determinant. But we have still to urge that an absolute *nihil privitivum* is not the presence, but the denial, of all possible determination or predication. If universal being *is* in pure thought, or otherwise, then non-being is not, else being is relative and finite. However, whatever or so far as being is, non-being is not. This is purely logical negation, or the mere denial of what the first or affirmative notion asserted, without in any way implying any thing else in its place. Opposition is here equivalent to diametrical contradiction, and the application of the method of the excluded middle is undoubted. Hegel cannot, then, have meant that being and nothing are logically opposed, or else becoming, as their synthesis, would be forever impossible. But if we define *real* opposition, with Trendelenburg, as the denial of an affirmative notion, by another affirmative notion, so far as they must be mutually related, what have we, then, but the obverse side of Mill's "associative impulse," or a new and somewhat quaint illustration of the doctrine of relativity? Nothing, like being, is positive only; it is in a new relation, and the dialectic process, instead of being in any sense genetic, is as capricious and arbitrary as the psychological factors of attention. In fact, there is no contradiction whatever, save in the Herbartian sense of mere difference.

Trendelenburg's question is still more searching.

How does thought get from its first affirmative term to its second denying affirmation? It can only be by reflection from sense or understanding. "The nothing is attained by comparing the pure being of thought with the *full* being of sense-perception."

But we must not forget that being and nothing are not affirmed to be *absolutely* identical. We are not required to say both yes and no to the same question understood in precisely the same sense, else there were no possibility of becoming. If A equals A, it cannot become A in any real sense. Every thing flows, said Heraclitus, because it is and is not at the same time. Only movement is and is not at the same point and moment, said Trendelenburg; and so movement, understood in the most generic sense, as common to thoughts and things, and not becoming, is what is motivated here. But motion is an original factor, of a new species. It is, even Trendelenburg admitted, the existing contradiction which formal reasoning easily proves impossible. Thus contradictions *are* overcome, though all static logic is powerless to tell how.

If the problem of creation were absolutely indeterminate, if the atoms of the Lucretian rain had been infinitely diffused, or had not swerved from the straight equidistant lines of their course, "there could have been no law, even of gravity, for its existence depends on the distribution and collocation of matter." These would have eternally remained an infinite equation of possibilities, every element perfectly poised and balanced, an infinite here, an eternal now. In language less mathematical and more familiar, the homogeneous is unstable, and must differentiate itself. But why, if purely homogeneous, can it be unstable, and whence

comes the *must*? Formal logic, which deals with ready-made ideas, can always prove development impossible; for every sort of creation must be regarded as the irruption of an extraneous power into the realm of Saturnian repose.

Thus it is that the necessity of an empirical principle is demonstrated, which must be at the same time simple and universal. Now, psychological analysis and physiological investigation concur in designating motion as such a principle. Vierordt and Exner and others have shown some reason for believing that the perception of motion is the only immediate sensation, and, unlike other rudimentary psychic processes, not founded on unconscious inferences of any sort. The sense of motion, it is claimed, is the quickest, the most minute, most primitive sensation of animal life; out of it all the higher faculties of the soul are developed, and in many common delusions of muscular and other feeling we may still detect its original forms, uninterpreted — indeed, almost forgotten — by adult consciousness. The facts upon which these inferences rest are, it need hardly be said, far too few to warrant any positive conclusion of this sort.

But shall we then urge, with Trendelenburg, that movement, in a broader sense, is the only aspect common to both thought and being — is the *prius* and the medium of all experience? Because, he argues, the original activity of mind is best described as the counterpart of material motion, knowledge of the external world is possible and valid, though it is imperfect so far as this analogy fails.

Because of this common term ideal, *à priori* categories are possible and valid in experience. Time is the

internal result, space the external condition, of movement. If we are asked to explain light, heat, electricity, chemical change, the laws of physics or astronomy, the mode in which mind acts on matter, or the essence of either, or even the way in which the idea of a line, a surface, or a sphere, or a logical conception, arises in the mind, we can only reply in terms of movement in time. Molar is explained by molecular, known by hypothetical motion. Yet movement, which explains all things, is itself unexplained and undefined. By it all things are known. It must be self-known. If we try to *derive* movement, or construe it into non-motive terms, we are like a blind optician, who does not realize that sight can be understood only by seeing.

Here we shall at once be met by the objection that movement in thought and physical motion have nothing in common but the name. We grant at once that succession in consciousness and objective sequence are two very different, and perhaps incommensurate series; but as soon as one psychic term follows another in the same *order*, as the corresponding objective term follows its antecedent, we have, if not as Chauncy Wright argued, the very beginning of consciousness — at any rate, *pro hac vice*, the truest form of knowledge; for what is causation but the postulation of something in the bond that joins two things, that is common with the bond that joins two thoughts, or *vice versa*?

We quite agree with Hegel that we may be said to know a thing, even the mind itself, most truly when our thought has followed all its changes in time, or has traced all its processes above; but we insist that the dialectic method is in no real sense genetic.

It is easy to conceive the external world as real, or as ideal, but impossible to conceive the *order* of the terms which common consciousness ascribes to it as real, as the reverse of that ascribed to it as ideal. Philosophy may still find pleasant pastime in resolving the universe into all-object or all-subject; but has she not a higher destiny than to amuse herself with this see-saw of reality and ideality, in despair of ever getting out of the labyrinth in which the theory of knowledge has entombed her, remote from the common life of men, and dead to the issues and impulses of science? May not pure idealism read a wholesome warning in the fate of the obsolescent materialisms of the past, indefinitely superior as it is in every way to them? Are mind and matter mutually exclusive or contradictory? Must the world be all one or all the other? or is there much that is common to, yet more than, both, as yet known? These are the questions which psychology has made pertinent, though it is as yet by no means certain that it can ever answer them.

The simplest elements of sensation that common consciousness recognizes, and which seem immediate and instantaneous, are yet resolvable into a series of yet more ultimate states. The simplest act of vision, for example, is a whole cosmos of such psychic elements. Each of these changes has at some point of the nervous system, as a counterpart or background, some demonstrable form of molecular, electrical, or other physical change. Now, if pure sensations may be described as an immediate knowledge of physical states; if æsthetic feelings, or pleasure and pain, are conditioned at all by the nutritive state of nerve-fibres; if the muscular sense is an *à priori* knowledge of relative position or

motion of parts of the body; if organic sensation, or the feeling of general depression or elation, and, above all, if Wundt's hypothesis of the direct consciousness of innervation registering accurately every increase or expenditure of nerve force be allowed, — then surely those elements are not *unconscious*, but are the most innate forms of self-consciousness, — the mother-tongues of sensation, — from which all the functions of sense-perception are developed, along with the form of sentient organism, by intricate processes of extradiation and *intradition*, if the word be allowable. A primitive immediacy, or absolute identity of subject and object at some point back of all of individual experience, perhaps is thus postulated. That mind and matter may even be proven identical to the understanding, will of course seem a forlorn hope. It is so; but is not the alternative for philosophy still more forlorn? Of course, to all who do not thoroughly prefer the pursuit to the possession of truth, the assurance of Hegel that the problem of things is essentially solved, or even the confessed nescience of Spencer or the new Kantian school, will seem far more philosophical than such a mere programme of long investigations yet to be made, — a programme that must itself, no doubt, be recast again and again with every new discovery. But does not psychology, as well as the history of philosophy, teach us that the outstanding questions of thought have always seemed settled in proportion as men's minds were shut, or as they confounded the limits of their own individual development or culture with the limits of possible knowledge? If the truth-loving reason is not to be satisfied with ever deeper insights, in a ratio corresponding to its own increasing power; if, as

Tyndall intimates, the essential principles of science are all found out, and nothing remains but to pigeon-hole all the details of knowledge: then the world in which thought lives and moves is but little better than a dead moon, and pessimism, the true devil-worship of philosophy, is inevitable. The apparent achievements of individuals were never less, but the real work done in philosophy was never greater or more promising, than now. It is for her to ask questions; and rarely, indeed, is it permitted her to answer them, save by other questions broader, more earnest and searching. Philosophy is no longer a guild, or even a profession, so much as a spirit of research inspiring many specialties. It is because physiological psychology, with true Socratic irony, dares to take the attitude of ignorance toward both a positive philosophy and a yet more positive science, while it puts the same old question of philosophy in such new tangible terms, and with such a divine soul of curiosity, that we love its spirit, and hope much from its methods. Nothing since the Phenomenology, which seems to us to contain the immortal soul of Hegelism, is so fully inspired with the true philosophic motive.

In creating and using a technical language, Hegel is unsurpassed throughout the Logic. He is a master of illustration, and of clearness in detail. If the maxim, *bonus grammaticus, bonus theologus*, were true of the philosopher, there would be little left to desire. But the trouble lies far deeper than style. Numerous as his school has been, no two Hegelians understand their master alike. Gabler says Trendelenburg's misunderstanding of him is inconceivable; while Michelet says Trendelenburg understands him better than most of

his followers, but that Zeller's misconceptions are "monstrous." Stirling describes Haym's ignorance of Hegel's meaning as strange and inconceivable. Michelet considers that the greatest error of Krause, Herbart, and Schopenhauer is in fancying that they are not true Hegelians; while in a recent pamphlet he says, in emulation, perhaps, of Hegel's assertion that only animals are not metaphysicians, that all who think must be Hegelians. Gans thinks the dialectic method is an instance of pure deduction. Gabler says the idea created being out of itself; while the young, or left, Hegelians assert that the idea is God immanent, not so much in the world-process or the race-consciousness, as in the individual soul.

But it is not concerning the logic so much as the philosophy of rights, æsthetics, and especially of religion and nature, that Hegelians disagree. Yet the impulse he gave to thought in these fields was unprecedented. His *Philosophy of Nature*, for instance, of which Trendelenburg more wittily than truly said that it might claim to be a product of pure abstract thinking more justly than the *Logic*, and which when the first editions of his works were sold was most in demand, gave an impulse to natural sciences none the less philosophical because, in the ferment which followed, Hegel's views were soon outgrown, and his method forgotten. As a wholesome stimulant of every motive of philosophical culture, and as the best embodiment of the legitimate aspiration of the philosophical sentiment, we have gradually come to regard Hegel's system as unrivalled and unapproached, yet, at the same time, as fatal as a finality, almost valueless as a method.

HARTMANN'S NEW SYSTEM OF PESSIMISTIC ETHICS.¹

THOUGH Hartmann's education was mainly military, he had found time for much reading of philosophy and general science, to which he devoted himself at the age of twenty-three, and a few years later leaped into sudden and world-wide fame by the publication of his "Philosophy of the Unconscious." His opinions were novel and often startling; every chapter was full of such curious scientific facts, and his style so simple, direct, and popular, that even cultivated German ladies fell to reading philosophy, and have never ceased to interest themselves in the remarkable personality and the no less remarkable career of the author.

Intelligence, in the system of Schopenhauer, is a final form of development from an unconscious and unreasonable will; while, according to Hartmann, will is guided from the first by knowledge, and indeed is inseparable from it save in the mind of man. The unconscious is at once Fichte's absolute ego, Schelling's absolute subject, Hegel's absolute idea, the Spinozistic substance, the Eleatic one-all, etc. It is the organizing power in nature, guiding instinct to act ac-

¹ *Phaenomenologie des sittlichen Bewusstseins. Prolegomena zu jeder künftigen Ethik.* Von Eduard v. Hartmann. 890 pp. Berlin. New York: Westermann. 1879.

according to a purpose without knowledge of the purpose, building up the nervous system and then tenanting it with a soul. It makes no mistakes, never hesitates, is clairvoyant, divine, and finally compels us to infer final from efficient causes. The ultimate end and purpose of the universe, he insisted, was not justice, goodness, happiness, or freedom, but the development of consciousness. Yet the more consciousness, the more unhappiness; pleasant impressions fade, those which are unpleasant are indelible. Men have awaited happiness successively in the future of the individual on earth, and in the future of the race in this, and finally in another world, but vainly and without reason. In view of all this we must not, as Schopenhauer said, cease to will, but press on in the universal struggle to develop intellect till action become so utterly irrational and antagonistic that it must cease forever. How all this occurs, is left very indefinite; and it is precisely here that the new synthesis we are about to consider begins.

* The discussion occasioned by the publication of the "Philosophy of the Unconscious" was bitter, and has now lasted a decade, while the work has just passed to an eighth edition. Professor Michelet expressed "honest pity" for an author who brings such "miserable nonsense" into the philosophical mart. J. C. Fischer called it a "pyramid of absurdity" fit to "excite universal laughter." Dr. Hausemann feared that the doctrine of the infallibility of the unconscious would tend to the notion of a potential infallibility of the Pope. One avers that Hartmann has "shamefully duped the world," another calls his book a "snarl of idiotic stupidity." "Reason run mad," "the odor of

death pervading the whole volume," "purely pathological," "frivolity and pretence," "the jugglery of logic," "a plea for moral bankruptcy," and similar verdicts almost by the score, have been pronounced by adversaries. On the other hand Professor Lasson considered it one of the best expressions of the tendencies of modern times, admirably calculated to reconcile the classic works of German philosophy with the methods and results of modern science. Professor Kapp calls it the inauguration of a "new way of regarding the universe." Professor Schweitzer considers it very significant, brilliant, interesting, etc. Other writers too numerous to mention, but to whom Hartmann has called attention in a prospectus, have more guardedly spoken of his system as "genial," of a "thoroughly pure and noble moral tone," as a "remarkable bit of culture-history which will survive the next century," as "suggestive to an unparalleled degree," etc. Thus it is, perhaps, not too much to say with Dr. Kirchmann, that its reception, not only among scholars but throughout the reading world, was unprecedented in the previous history of philosophy.

Soon after the publication of this work, in 1869, the author was honored by a call to a professorship of philosophy at Leipsic. His health made it impossible for him to accept, and the chair remained vacant till it was assumed in 1874 by Professor Wundt. He has published in the mean while several minor treatises: "The Self-Dissolution of Christianity and the Religion of the Future;" "Critical Foundation of Transcendental Realism;" "Strictures and Elucidations of the Systems of Kant;" "Schopenhauer and Hegel;" "The Unconscious from the Standpoint of Physiology

and the Development Theory ;” “The Truth and Error of Darwinism ;” and a volume of “Collected Studies and Essays.” The author has lived meanwhile in the greatest retirement in a simple and almost homely style in an uninteresting suburb of Berlin, leading a purely intellectual life, and not in the least indebted for his influence to personal inculcations or to literary cliques. He is essentially a man of genius, a musician, a painter, and the author of one tolerable drama. He is a most indefatigable worker, eschewing most current literature. His manner and personal appearance are striking. He is short and rather thick, walks with great difficulty and only on level ground, and prefers to wheel himself in an invalid-chair. His long, abundant sandy hair and beard, and his fine poetic eye, his very rapid utterance and quick movements, his brief characterization and denunciation of the “professorlings” who most severely criticise his opinions, his confidence that he is only in the beginning of his philosophical activity, all combine to make a most strongly-marked and original personality, in which the keen sensitiveness of a poet and an invalid is combined with great force of purpose and power of sustained mental effort. His pessimism is almost a religion with him, and he accepts and defends with ardor in private conversation all its consequences and implications. A rather prominent place among synthetic thinkers must be allowed to him ; and the appearance of his new work, narrower in scope but much more thorough in method than his first, is an event of considerable literary if not of truly philosophic moment.

The first and lowest form of moral consciousness, says Hartmann, was characterized by the Cyrenians.

Their naïve hedonism taught that pleasure was the end of life. The discussion of the different sorts, degrees, and consequences of enjoyment, led to the true eudæmonism of the Epicureans, who taught that mental pleasure was preferable to that of the senses, and that friendship, and freedom from passion and desire, were the supreme forms of happiness. Aristotle, Hobbes, and especially Spinoza, represent this system in greater detail. Its practical half-truth is a wise and moderate *savoir vivre*, which is the highest result of what is termed the mundane positive eudæmonistic morality. As soon, however, as men begin to reflect on the disproportion between happiness and merit, the postulate of an all-wise and transcendental Judge is erected, and by degrees develops into a system of rewards and punishments in a future state. To this vulgar form of egoism, best represented according to the author by the Jesus of the synoptic Gospels, earthly motives and pleasures soon come to appear low and unworthy when compared with those which are heavenly. This antithesis he regards as both false and impossible. Sensuous elements are inexpugnable from every conception of a future retributive state, and a noble epicureanism is far better. The inevitable self-criticism of this moral scheme leads to the negative phase of cynicism. Pleasure is seen to be impossible; and the individual in this stage withdraws from the world, and is indifferent to its opinions. He seeks only to lead a harmless life, and avoid evil, and feels that the world can neither give him any thing he desires, nor take from him any thing he loves. This again is a partial, because a merely individual, standpoint; and the "negative transcendent moral" is sure to be inferred. Suicide,

or refusal to live by asceticism, or the insight that the end and object of living is not to be happy, but to be independent of happiness, and that only those who know little and whose experience has been shallow find enjoyment in life, result from various degrees of development of this stage of moral consciousness. All morality, at least, is only a palliative between full enjoyment of the world on the one hand, and refusal to live on the other. In this extreme of self-negation the ultimate but inevitable bankruptcy of every egoistic moral system is manifest. The first cycle of the moral consciousness ends thus in utter self-renunciation and despair.

The more complete this shipwreck of the selfish principles, the more eagerly do men grasp after heteronomous authoritative principles, and the more uncritically do they apply them to the guidance of conduct. According to the well-known views of J. H. Kirchmann, this is the highest morality. Humanity, the state, etc., is infinitely higher and wiser than the individual. To obey because we are commanded, is the highest and final moral motive. Precedent in law, good government, business, social intercourse, all depend on this instant and complete surrender of the individual will to higher authority. The moral act brings rest, but never pleasure, etc. True, replies Hartmann, the sentiments of reverence and veneration are independent of the feelings of pleasure and pain; but even these must not be unduly exalted above self-respect, and independence in thought and action. The origin of paternal authority is sought in the animal instinct of defending the young. This is the first and fundamental form of all authority. Legislation stands

for the control of the worst elements and individuals by the moral consciousness of the best. Custom is an unconscious, which should be replaced by a conscious, morality. Church authority is the most insidious and dangerous of all for both mental and moral culture. The autonomous movement by Protestantism is of great theoretical, but has proved to be of little practical, worth.

With the discussion of such points the introductory, or "pseudo-moral," portion of the work ends. It has shown that conscience is not simple, but a very complex product of all varieties of instincts, feelings, opinions, tastes, etc., and that freedom of conscience postulates merely the negation of every heteronomous element. Every thing is thus far strictly in the spirit and method of Hegel's *Phenomenology*. Hartmann expressly assumes the same objective standpoint, and, though renouncing the dialectic method, has not, save in a few inconspicuous details, succeeded in working his way to independence of his most ingenious model, which is now coming to be considered in Germany not only as the most significant part of the Hegelian system, but as one of the acutest and most suggestive of all the products of philosophical thought.

Is there in consciousness a spontaneous ethical estimate of human actions, apart from all conformity to outer authority or influence? With the discussion of this great question the second part, which is entitled the "True Ethical Consciousness," begins. First among the subjective motives of morality is the æsthetic principle of taste, the existence of which enables us to answer the above question, which is purely empirical, affirmatively, by asserting the existence of such a prin-

ciple without telling or knowing what it requires. Taste is conscious of no objective or subjective reasons for its choice, and it demands only what is morally beautiful. The doctrine of the golden mean is the apotheosis of mediocrity. The principles of harmony, of perfection, moral ideal, and the many reconstructions of society proposed by reformers, are all shown to be the products of merely aesthetic judgments. A deeper moral principle is found in feeling. Pathos, enthusiasm, pride, humility, regret, resentment, sociality, sympathy, fidelity, love, are each characterized in long sections; and a transition is finally made, through the feeling of duty, to what are termed the rationalistic moral principles, — practicality, truthfulness, freedom, accountability, and purpose. The latter is here the most comprehensive of all moral principles, just as in the Philosophy of the Unconscious it is necessarily conceived as the *inner Moment* of the absolute. We constantly and inductively infer ulterior from nearer immediate ends, and the teleological ordering of our actions teaches us not only their, but our own, relativity. The "higher egotism" is thus bankrupt, and the ethical consciousness turns at last towards altruistic social ends. Social-democracy seeks the greatest enjoyment for the greatest number. This would not be diminished by the decay of culture, which is, in fact, the greatest enemy of general happiness. The illusion of the greatest-happiness principle would eventually lead the world back to animalization. But against this consummation the ethics of evolution not only teaches that the most vigorous and virtuous survive, but it impresses the duty of developing intelligence to the uttermost. True, the culture of a high

civilization necessarily produces misery, poverty, and vandalism. It tends to unsphere women and to the precocious cephalization of children, excuses competition and even war; and hence, finally, a higher absolute, monistic, religious moral principle must be sought, which shall tend to the practical and essential identification of individuals with each other, and then with the absolute itself.

We must know and autonomously will to follow non-egoistic absolute ends as essentially our ends. Cosmic development is the life-process of the absolute, which must be presupposed as identical with my own essence and as teleological. Accepting its unconscious ends as our own, we are able to do morally right so far as we develop the full consciousness that our will is but a branch of the all-will. If the notion of an absolute, or of God, is to have any value as an hypothesis, we must conceive him as unhappy before the beginning of things. The final cause of creation was not, as Hegel believed, a self-mirroring of the absolute. The unfolding of the universe is rather a pathological healing process which goes on within it. The world is a "plaster to draw its inner pain outward." The positive transcendental happiness of God before creation is purely mythic. The divine complacency which pronounced all that was made "very good," expressed no positive joy or satisfaction, but only an amelioration of inner woe. Cultured piety sees that pity, not love, for God is man's highest duty. The emancipation of the absolute from its transcendent unhappiness may never be complete. New generations, races, worlds may ever perpetuate the immanent torture, nearing only by asymptotic approaches an equilibrium between univer-

sal pleasure and pain ; but we must never forget that the world and the absolute must be redeemed, if at all, together. God can redeem the world only by being redeemed by it. Only the phenomenal selfish individual, who seeks pleasure, fancies that he can find release from the duty of universal co-operation in death, which he is too puny-souled to seek. All the elect understand that the supreme duty of redeeming God from pain, or of "ameliorating the negative eudæmonism of the absolute," is a duty which will end only with the universe itself. The work closes with the sentence : "Real existence is the incarnation of deity ; the world-process is the passion-history of God made flesh, and at the same time the way to the redemption of Him who was crucified in the flesh. To be moral is to lend a helping hand in shortening this way of suffering and of redemption."

From this all too brief epitome the reader may see that the classification of the various moral theories which occupy the first three-fourths of the ponderous volume is ingenious and suggestive, and exhibits a broader and more philosophical plan of treatment than is found in any modern ethical work ; but it is no less evident, on careful reading, that neither the author's scholarship nor his critical or analytic power has sufficed to justify the pretentious title of his work. His systematic method is arbitrary, his transitions, especially from the morality of taste to that of feeling, and again to that of reason, often purely artificial. His spirit is more dogmatic and mystic than in his earlier work ; and the book, though expressly addressed to lay readers, is far less simple in style. He has had the hardihood to carry out the pessimistic conception

of the universe to its extreme logical consequence. His "system" is complete. It is a most gloomy poem by a sensitive æsthetic soul whom fame does not comfort for personal misfortunes. He has the synthetic power of an artist and not of a philosopher. Attention is irresistibly drawn from his work to his personality. Hence a strictly psychological (none the less interesting if it proves pathological) problem is presented to the critic, viz.: what physiological or other reasons will explain why an aristocratic and vigorous young soldier, suddenly robbed of his career, his associations, his personal comeliness, his fortune, and largely even of the use of his muscles,—those most faithful servants of the will,—living in retirement with a wife sensitive, cultivated, and invalid like himself, should find satisfaction in believing and teaching that all happiness is born of ignorance, and that Deity is in need of human pity and help? We have no present wish to discuss this problem; but Herr v. Hartmann should at least not forget, when he tells the complacent world that it is miserable in spite of fancied happiness, that it will be apt, before accepting his pessimistic gospel, to ask most searchingly if the unhappiness he fancies is or should be universal is not really his own.

A FEW RECENT PHILOSOPHICAL- WORKS.¹

PROFESSOR LAAS of Strasbourg, whose name was mentioned along with that of Professor Wundt as a candidate for the philosophical chair left vacant in Berlin by the death of Harms, has written one of the most important works of the last twelvemonth in his department. He attempts to show that all forms of idealism which have taken their rise within Christian centuries and countries are derived from Plato. Realism in logic, *a-priori*-ism in the theory of cognition, nativism, spiritualism, ontology, gnosticism, scholasticism, Boëthius, G. Bruno, Des Cartes, Spinoza, Leibnitz, Kant, Fichte, Schelling, and Hegel, and even theologians, to say nothing of mystics, illuminati, and romanticists of many modern centuries, owe their impulse and subject-matter more or less consciously to the great Academician who has done more than any one else to "flatter man's natural disposition to spiritual drunkenness." Professor Zeller had shown that the constitution of the Christian Church was modelled in many essential respects after the Platonic republic; and Laas has hence, we think unfairly, been called a pupil

¹ Idealismus und Positivismus: eine kritische Auseinandersetzung. Von Ernst Laas. Erster allgemeiner und grundlegender Theil. Berlin, 1879. pp. 275.

of Zeller. He has been influenced far more by A. Lange and J. S. Mill, to whom he acknowledges great indebtedness; while both his scholarship in the field of historical philosophy, and his boldness and originality, are scarcely less than amazing. Although Plato expressly excluded mathematics from philosophy, Laas declares that the first fundamental trait and assumption of Platonism is, that as a system of eternal mathematical truths is inherent in space, so a system of eternal ontological truths is inherent in being at large. This became afterward the assumption of the Aristotelian and even of the Hegelian logic. Not only pantheistic conceptions of God as an infinite unity, analogous to Euclidean space, including in himself all stereometric forms as expungeable modes or affections, but the method which insists upon the necessary existence of an unmoved mover of the world, and deduces his attributes like so many theorems and scholia,—both are essentially and genetically Platonic. So are in a word the apodeiktic, scholastic, syllogistic method of definitions, axioms, and conclusions, as well as Aristotle's "passion" for deducing, Spinoza's ethics, Wolff's dogmatism, Kant's love of precision and form, and the manner of minute, laborious, and verbally exact ratiocination, occasionally found in contemporary philosophical treatises.

The second element of Platonism, Laas defines as the "passion for the absolute," and the "Titanism" which strives to realize it in finite forms. Every thing is referred to a single presuppositionless idea, as a major premise to which all assertions are ultimately referable, and without adducing which no question can be completely answered. The nearer this principle is approx-

imated, the more certain, immediate, "pure," or "scientific" does knowledge become. Far above all material science stands this principle of identity and contradiction, the highest formal principle of philosophy, and beside it the highest material principle of theology, God. Were he not, nothing else could be. There must be also absolute maxims of right and wrong, and a *best* which is pure goodness itself. Even practical idealists like Fichte and Rousseau, who cry "All, or nothing," illustrate this element of Platonism. The third assumption is that there are normative laws of reason, through which all that is real is knowable, and all that is willed is good. These *a-priori* laws are often described as if they inhered not so much in the individual as in universal reason. Leibnitz, Kant, Herbart, and the Scotch school have elaborated this Platonic radical in its relations to intelligence; while the Stoic, Ciceronian, or Christian conscience, good heart, moral instincts, etc., as an inner (categorically imperative) voice of nature or of God, exhibit the same element in a more popular and distorted form. Fourth is the spontaneity-motive. Over against the passive perceptions, feelings, memories, passions, etc., is construed a higher, active, free self. Though more commonly seen in theories concerning the will, the Cartesian notion of perception, as a "formative and productive" re-action of the soul upon external stimuli, — a notion which Lazarus uses to explain even the spacial form of things, — Kant's spontaneous understanding, Fichte's energetic ego, Hegel's creative *Begriff* which presses forward from thesis to antithesis, from quantity to quality (or the reverse), or to the negation of the negation, with a sort of genetic evolutionary force,

—all these illustrate it as well. Most popular, however is the fifth, or transcendental motive of Platonism. The dualism which permeates so many of the Dialogues, culminates in the notion that the higher spiritual element in man must apprehend an intelligible world above that of sense, and independent even of time and space. Upon this motive, so familiar in the teaching of the Church, we need not dwell.

Many who follow the author sympathetically thus far will be somewhat startled to find that he believes that the world can now, not only with safety but with profit, dispense with every form and element of Platonism, whether ancient or modern. He asserts that the only need of having any philosophic basis to life at all is ethical. If moral sanctions were indiscriminate, all conscious states might be equally real, all opinions would be alike true, and the wise man would be no better off than the fool. For these purposes, however, Laas thinks the "basis" need not be ideal in the sense of the schools. In other words, he is a rigorous positivist, and can dispense with even the Heraclitic conception of becoming. This Plato misrepresented. Its main point is not that things are in a constant state of flux and change, but that subject and object are inseparable and correlative, very much as Protagenes argued. Those who find most satisfaction in insisting upon evolutionism as a finality are those who, unlike positivists, need a creed. The book is a thorough, honest, manly piece of work, without crudity, evasion, or a trace of sentiment or triviality; and, strongly as we dissent from some of its fundamental positions, we commend it to those who want a still better indication than Lange, Göring, or Avenarius has given, how far beyond even Mill positivism has gone in Germany.

Herr Schneider, for some years a teacher in Naples, now assistant of Professor Haeckel at Jena, has written a work of great compass and much originality, on animal instinct.¹ The book opens with a tasteless personal attack upon Dr. Dohrn, founder and head of the zoölogical station at Naples. Intemperate and oft-repeated praises of Wundt, whose work in this department was long ago superseded, and still more of Haeckel, who advised the author, in his many original studies in aquariums and zoölogical gardens, to confine himself to the central point of will as expressed in movements; scorn of theologians and all lukewarm evolutionists; biological commonplaces and obvious inferences, — make up the first one hundred and fifty pages of the book, and might with great advantage be omitted, or cut down to a brief chapter. The remainder of the volume, as if written at a maturer period of intellectual development, is occupied with a condensed enumeration and digest, and a new and convenient classification of the instincts of animals, from the lowest up to man. The former includes most of the best things in the ponderous tomes of Brehm; and the latter was suggested by several smaller psychological studies which the author had previously made and published. First and lowest are the *sensory instincts*. These are direct re-actions from touch, and are the only grounds of action in the lower animals. Food, enemies, individuals of the other sex, are distinguished only by contact. The character of the various re-actions excited by these contacts in different organizations is illustrated at length. Reflex actions, which most physiologists agree in calling mechanical, Schneider insists on considering

¹ Die thiersche Wille. Von G. H. Schneider. Leipzig: 1880. pp. 447.

as complex results of instincts. If all these adaptive movements are unconscious, he asks, why did the adaptive principle of nature give consciousness at all? A sensory element must thus be assumed at the bottom, not only of knowledge, but of motion and will. Next higher, and developed from these, are the perceptive instincts; which are re-actions at a distance, mediated by sight, smell being an historical transition between the two. Birds build curious nests because they see the place and material. Insects lay eggs on leaves where their young can feed, because those have survived who were stimulated to lay by the visual impression of that peculiar leaf. Some fish cannot help snapping at any small object in motion. Animals form societies, not, as Espinas says, for protection, but because the sight of others is pleasant. Nervous fibres, and especially cells, are more adaptive than a fin or a webbed foot to its element. These instincts are most numerous; and upon this class much of the author's space is spent. Representative instincts constitute a third class. In these a past perception is called up, and produces its own re-action, or is interpolated, perhaps along with others, between the initial sensation and the final resultant action. In the latter case the instinct may be called rational. Brief but suggestive sections on indirect or auxiliary instincts, or grouping of instinctive actions into nutritive, protective, procreative, etc., on heredity, and the modification of instinct, conclude the volume, which every psychologist must read, though few will do so without dissenting from many of the author's generalizations.

Siebeck's *History of Psychology* is the only modern work upon that subject, except the brief and imperfect

one by Harms, which has ever been published.¹ The author is fully aware of the fundamental position which psychology has assumed in modern science; echoes the new cry, "Back to Plato!" which is superseding the old, "Back to Kant;" recognizes the fact that dualism, instead of being accepted as a finality, is to be explained psychologically, and accounted for historically, like language, the love of ornament, etc.; has studied the problems presented by *Völker-psychologie* in the works of Tylor, Bastian, Waitz, Peschel, and many others; and signalizes with Steinthal the important epoch, when after individuality was lost in the Homeric unity with the object-world, and after it was merged in Doric corporate life, the "subjective personality broke through" at last in Archilochus about the time of the Ionic philosophers, was emphasized by the Persian war, was given a partially scientific form by the too-much-neglected ancient medical psychologists, and finally became self-conscious in the sophists, and was wrought into distinct form by Plato. The work is carefully and conscientiously done, but is somewhat lacking in comprehensiveness of plan. There are none of those suggestive side-lights which Zeller and Fischer know so well how to throw upon the history of philosophic studies from the art, literature, politics, and religion of the period.

A convenient *résumé* of the voluminous works of Krause, made by a devoted disciple,² reveals still more

¹ *Geschichte der Psychologie*. Von Hermann Siebeck, Professor an der Universität Basel. Erste Abtheilung, die Psychologie vor Aristoteles. Gotha: 1880. pp. 284.

² *Die krausische Philosophie in ihrem geschichtlichen Zusammenhange*, etc. Von Dr. P. Hohlfeld. Eins von der philos. Facultät der Universität Jena gekrönte Preisschrift. Jena: 1879. pp. 146.

fully than was known by those who have never seen his unprinted philosophical remains, how incoherent this "overshadowed" contemporary and acquaintance of Fichte, Schelling, and Hegel, really was. With a veritable genius for music and mathematics, he chose the mystic Thorild and Lambert for his teachers, revelled in Pythagorism, Neo-Platonic and scholastic lore, and invented and wrote in an eccentric, but, as he called it, purely German terminology, much of which is said to be taken from freemasonry. His pantheism is of the grossest, yet he insists that he is Christian and Platonist. Fröbel was much influenced by him.

DEMOCRITUS AND HERACLITUS.

EVERY one who has observed the strange development of pessimism in the recent phases of German philosophy has found much that no ingenuity can reconcile with any scheme of utilitarian ethics. Hartmann and all the disciples of Schopenhauer especially love to emphasize the half-truth that "He that increaseth knowledge increaseth sorrow," — an observation which all wise men, in their better moods, contradict, as, indeed, its supposed author so often did. It is natural that melancholy, the most insidious of all insanities, should prey upon those souls in which the culture of intellect has outstripped that of heart and will, and all high ideals have come to seem unrealizable, and from which enthusiasm has vanished before insight has been attained. The period of gloom and despondency which John Stuart Mill, for instance, describes in his own early manhood, was the natural result of a precocious, one-sided, and too exclusively mental culture. The excitement of the fresh impulses of the "Storm and Stress" period of German literature produced a natural re-action in Schiller's disposition which brought him too, for years, under the spell of Cassandra. Coleridge's gloomy fits were due to native imbecility of will. In men like Heine and Byron, and scores of others less gifted, the same was superinduced by irregular

lives. Goethe thought that all men who are great in thought must pass through such a phase of soul; and Emerson assures us that Buddha in the jungle, Mohammed in the desert, and even Jesus in the wilderness, were only perfecting their faculties by a necessary discipline of sadness.

Hence, by a most illogical conversion of terms, it is inferred that sorrow and suffering are the great main-springs of mental power and insight. "A sad mood unfolds a wider mental horizon than joy," is the text of this gloomy wisdom.

This may, in part, excuse the strange egotism of the modern pessimists. Happy men do not believe that there is no wretchedness in the world, or that men are mistaken in calling themselves miserable. But as soon as a one-sided thinker is precipitated by his hobby or otherwise into a deep dump, he is certain that no one is, ever was, or can be, happy; least of all, those who think themselves so. It is only the miserable and the despairing who are really happy; and herein Dr. Hartmann believes he has uttered the biggest paradox ever devised upon this or any other subject; and, like every one who has said a brilliantly absurd thing that is brand-new in Germany, he has a "school," and his rapidly appearing disquisitions are still one of the sensations of the philosophical world.

Schopenhauer has pointed out the most facile and flowery path down into this Inferno of despair; and, if we take him for our guide, we shall meet many familiar faces. Take, e.g., that morose, saturnine old bookworm, who more than two centuries ago lived within a stone's-throw of the University Library of Oxford, — Robert Burton, the author of "The Anato-

my of Melancholy." He read assiduously, and with amazing memory, for thirty years, scores of old authors that no one else ever opened. He read how the alchemists sought to make gold, what specifics would cure gout, cancer, rheumatism, lycanthropy, moon-sickness, and midsummer madness. He gloated over the long iliads of fancied woes endured by hypochondriacs and maniacs; studied the old astrologers, and became an adept in casting horoscopes long after Europe had outgrown such follies. He studied the temperamental effects of hellebore and borage and Saturn and Mars, and many other plants and planets. He took pleasure in computing how many thousands of men Cæsar or Hannibal or Charlemagne had slain, and how many died of the plague in London. He foreknew all the events of his own life, and the instant and mode of his death, which was to be by suicide, — a prophecy which, some think, he was able to realize in the end. He came at last to so enjoy his own misery and the darkest pages of history and letters, that he believed he had cured himself of an hereditary tendency to melancholy, and called himself Democritus, the Laughing Philosopher. Who does not love to turn over the leaves of his ponderous scrap-book, and to note, here and there, the quaint drolleries, or more rarely the spasms of irrepressible joviality, which he bore with such patient resignation? Either he was heart-sick, brain-sick, mad, or else the world is so. Of course the world outvotes him.

Even Milton hails "Divinest Melancholy" as a "pensive nun, devout and pure," —

"Whose saintly visage is too bright
To hit the sense of human sight,

And, therefore, to our weaker view,
O'erlaid with black, staid Wisdom's hue."

Byron's soul was full of the inspiration of this atrabilious muse : —

"Count o'er the joys thine hours have seen,
Count o'er thy days from anguish free,
And know, whatever thou hast been,
'Tis something better not to be."

And again, in a more Titanic strain, he writes : —

"Our life is a false nature: 'tis not in
The harmony of things, — this hard decree,
This uneradicable taint of sin,
This boundless upas, this all-blasting tree,
Whose root is earth, whose leaves and branches be
The skies, which rain their plagues on men like dew, —
Disease, death, bondage, — all the woes we see,
And worse, the woes we see not, which throb through
The immedicable soul, with heart-aches ever new."

Heine spent a youth of dissipation till the fibre of body and soul was absolutely decayed, and then wrote the sweetest swan-like songs of despair, perhaps, in any language : —

"Warum singt denn mit so kläglichem Laut
Die Lerche in der Luft?
Warum steigt denn aus dem Balsamkraut
Hervor ein Leichenduft?
Warum scheint denn die Sonn' auf die Au
So kalt und verdriesslich herab?
Warum ist denn die Erde so grau
Und öde wie ein Grab?"

Shakespeare's Henry IV. exclaims at the close of an active and unquiet life, —

"O Heaven ! that one might read the book of fate,
And see the revolution of the times!

.

"How changes fill the cup of alteration
With divers liquors! Oh! if this were seen,
The happiest youth, viewing his progress through, —
What perils past, what crosses to ensue, —
Would shut the book, and sit him down and die."

As he approaches the end of life, man is oppressed with the sense, that, however successful it may have been, his life has been a mistake.

"Then old age and experience, hand in hand,
Lead him to death, and make him understand,
After a search so painful and so long,
That all his life he has been in the wrong."

Plato wrote, "If death only robs us of consciousness, like a dreamless sleep, it is wondrous gain."

Petrarch exclaims, "One thousand pleasures do not offset one agony;" and Voltaire said, "As flies are destined to be devoured by spiders, so are men destined to be consumed by despair." The book of Ecclesiastes, the extreme theories of human depravity, the struggle of the Hindoo sage for some hidden unknown good to be attained in self-annihilation, — all express the same sad pessimism.¹

Nor is this the worst. We will epitomize for our readers the most remarkable part of Dr. Hartmann's "Philosophie des Unbewussten." All happiness, he says, rests on illusion. One satisfied wish brings a thousand stronger unsatisfied wishes. Pleasure is misery's decoy duck. Ask any man suddenly on the street, "Are you happy?" No one will say yes: each will stop, ponder with surprise, and reply, "I was," or "I thought I was once," or "I should be if" — or, "I hope to be happy soon, very happy hereafter."

¹ See Schopenhauer, *Von der Nichtigkeit und dem Leiden des Lebens. Die Welt als Wille und Vorstellung.* Bd. II., p. 667, *et seq.*

The world is a hospital, next door to a charnel-house. Life does not pay expenses. Man never is, and never to be, blessed. Pleasant impressions tend to fade from the heart and mind; sad ones are indelible. Only shallow people see beauty and find joy,—in short, are happy, he says. Mephistopheles was right when he exclaimed, "All that exists deserves nothing but annihilation." Lessing was right when he said his infant son was most sensible and philosophical to die immediately after his birth. Dante would have been nearer right if he had named his Inferno Earth. "All men must be miserable," is written across the sky, "that leaden, ashy, and inverted bowl," that cages men in on every side. Optimists are Satan's emissaries. The history of the world has three stages. In the first, men believed they could be happy in their own individual earthly life. Children hope to be rich and famous when they are men, and men hope for position and power when they are old. This characterizes the ancient, pre-Christian age of the world. Men sought content, for instance, in love; but love, all too soon, was found to be a brief moment of rapture, followed by a long night of re-action and *ennui*. Pleasure wears out the very nerves. Art, learning, religious feeling, dreams, in short, every physical and spiritual pleasure, is tried and exhausted; and, after an experience of many generations, man came at last to realize that nothing in this present earth can fill the aching void within. All is vanity and vexation.

But a new hope dawns as the old one fades, if not sooner. Men at length dared to hope there might be a life beyond the grave, where soul-filling happiness is attained. Here is tribulation, but the world is over-

come. The very flesh will rise. The heart will close with all it loves. This, however, is only the second stage of illusion; yet it makes men happy in spite of present wretchedness. Friends who are lost will be met again on the "other shore." Man is poor, sinful, weak, but all his needs and wants will be gloriously fulfilled hereafter; and so men sacrifice property as bread cast upon the waters, hoping to receive manyfold by and by. They live in cells and cloisters, and become martyrs, in the hope of a martyr's crown of eternal glory. All this, Hartmann thinks, was well. The world was saved from despair by this hope when Rome fell. There is much comforting power in these splendid dreams for the spiritual-minded and the sick. But, alas! man is born to illusions. Science has shown that there is no place, no room, in all the realms of space, for heaven; that the body decays, and enters into other bodies; that consciousness perishes at death. The future of bliss, so fondly dreamed of, is a myth, a mirage of man's wishes, a projection of his hopes upon the clouds that enshroud the future, and the pall of darkness and despair falls more hopelessly than before. Life is the be-all, and death the end-all, here. Man is like a candle blown out, like a wave dashed on a rock, like a spark from a chimney, like a pillar of dust thrown up by a rude whirlwind.

But a new hope arises, and grows strong and vivid. The world-processes will evolve happiness in the remote future. We sink necessarily into nothingness; but our children's children will see the golden age, the world's millennium, the "All hail, hereafter," and be happy. Let us live for them. Many choice advanced spirits, he assures us, have reached this third stage of illusion;

but even this, too, must soon fade. The future will be as the past. Our remotest descendants will struggle with the flood as we do now, and the sturdiest swimmers of them all will sink with bubbling groan into the unknown depths at last. The world, with all its overcrowded masses of life, is a moribund planet. And now the terror and agony of despair seize hold of the philosopher's soul. He yearns with all the energies of his being for death, which is a surcease of pain. It is better to sleep than to wake, better to die than to sleep, better to be annihilated in Nirvâna than to die. The balance-sheet is struck between happiness and woe; and the heart, with all its aspirations and desires and wishes, is wretchedly insolvent. The world is typified by the Wandering Jew. Its sorrow is a form of superannuation; and in all its activities it is really, though insensibly, seeking only death.

What remains to be done? This, it has been said, is the only logical thing. Now that telegraphs and post-offices have made it possible to take concerted and simultaneous action, let the world agree on a day, an hour, a minute, a second, say fifty years hence, when every member of the human race will commit suicide; when, spurning this clod of a body, this dead lump of dirty earth, all mankind will join hands, and leap off with a one, two, three, all together, not into a future life, but into the inane nothingness which awaits them beyond the grave; not to find happiness, but to get rid of conscious and unconscious pain. Then the forces which humanity has monopolized or stolen from earth's processes shall flow back into her veins again, and she will be regenerated like another Eden, and a new, higher, and happier race be evolved,

æons hence. To many this seems more logical than Hartmann's advice to live, and cultivate the intellect?

It is hard to believe that the disciples, or even the propounder, of such a philosophy can be in dead earnest about it. When Carlyle asks, "What right hast thou to be happy? What right even to be?" we are tempted to treat it rather as one of Lord Dundreary's conundrums than as a serious metaphysical question. There is such a general consensus that the happiest life is best,—provided only that we have a satisfactory test of the quality of happiness, since, as the late leader of utilitarianism in England thought, men are well satisfied with a very little happiness, and that at intervals,—that, if serious, we must pronounce such a theory as the above to be a crime against human nature, one of the most treasonable misanthropies in the whole history of thought; far worse even, may we not say, than the old form of the theory of total depravity, with which it has so many points of analogy. Yet no one has done more to convince his readers of his sincerity than Herr Hartmann. Moreover, his school are scientists; and their motto is, "Speculative results, by inductive methods."

Herbert Spencer, who also philosophizes in the name of science, and who worships at the same shrine of nescience as Hartmann and Schopenhauer, has suggested, in "The Physiology of Laughter," a complementary theory, which might — could it not, Mr. Fiske? — be developed into a complementary system of optimism. Why do we laugh when we read, for instance, how Professor Poddingcroft swung a pail of water round his red and fiery face to illustrate to his pupils the rotation of the earth round the sun; how Gibbon

was so fat that he was unable to rise from his knees after making a tender declaration ; when a child tries to feed a wax doll ; or we read, as the striking title of a juvenile tract, " Buttons for Little Sinners' Breeches," — why do we feel the tendency to stretch the mouth towards either ear, showing the teeth, as carnivorous animals prepare to attack their prey ; and why do we expel the breath intermittently with gentle, convulsive cachinnations, instead of the usual way ? Why is this thus ? is always a philosophical question, a wise answer, a safe remark. Mr. Darwin may be right. Animals perhaps bare their teeth, as we smack our lips, when they are preparing to make a good meal. This gesture may have survived and developed in man, and laughter may mean, being interpreted into its original brute sense, " This is really good enough to eat." Mr. Spencer's theory is not inconsistent with this. In the state of mind called expectancy, the nervous system is keyed up to a very high pressure or tension. We look for something striking, grand, or important. But now suppose we find, instead, some insignificant object. We laugh because we experience a " descending incongruity," because we awaited much and got little ; precisely when according to Hartmann and his pessimists we ought to cry, or at least be miserable. A mass of emotion is generated, and then discharged, not upon the expected object, but over the system. A kind of emotional flood, or *douche*, causes a slight but agreeable convulsion.

" I will show you what no human eye ever saw, nor will ever see again," says the mountebank, as he proceeds to crack a nut, and eat the meat before his audience. " How shall we manage to get a pavement

of wooden blocks around St. Paul's?" the London aldermen are reported to have asked Jerrold. "Lay your heads together, and the thing is done." In trite examples like these, the "descending incongruity" is manifest. Expectant nervous tension is discharged on a small instead of upon the expected large object. *Montes laborant, nascitur ridiculus mus*, is the psychological formula for laughter.

O sapient Mr. Spencer! How like a patent medicine divine philosophy comes to heal all the woes of earth! What a new gospel of consolation is waiting to be developed from "this narrow-thoughted age, given over to business and Bethel"! When poor old Job, growing in wealth and favor, and full, no doubt, of "expectant tension," experienced a "descending incongruity," the truly philosophical thing for him to do was to laugh, and not to lament. The world has mistaken its comedy for tragedy. If trusted friends prove false, if times grow hard when we expected they would be easy, and we lose a fortune when we expected to make one, let us use a healthy philosophy, and correct our foolish and unfortunate habit of lamentation and disgust, and get out of the elegiac mode of pessimistic rhetoric. Every disappointment of life is but a descending incongruity; and the only proper and logical thing for us to do, where we have been wont to sorrow, is to open the mouth, stretch the lips laterally, inhale a full breath, and let it gurgle out with sonorous intermittance. This a healthy man does, while an unhealthy one becomes pessimistic.

More seriously, however, it is impossible to see any proper logical *nexus* between either Schopenhauer's Will, or Hartmann's Unconscious, and the pessimism

connected with these systems. The latter, although claimed as an integral part of Hartmann's philosophy, is, in fact, hardly more intimately connected with it than the later speculations of Comte with the *Philosophie Positive*. Nearly every attribute which Calvin assigns to God is given to the Unconscious, and the anthropology of the one system makes man as totally miserable as that of the other does depraved. The old logomachy between Infinite Goodness and eternal punishment recurs in new terms: How can the Unconscious be all-wise, and omnipotent, and leave man in such hopeless wretchedness?

The fact is, there never was an intellectual product more suitable for Mr. Taine's method than pessimism. The Encyclopædia was not more a product of the *Zeit-Geist* than pessimism. Oriental pessimism flourished because the people were poor, often scantily fed, oppressed by the lassitude of a hot climate, without political or social hopes or ambitions. Herr Hartmann found something to give his system verisimilitude in an epoch of disquiet and unsettling dissolution and transformation like ours. Callow, unphilosophical scepticism, totally void of æsthetic sense, destroys many of the choicest sources of happiness. Men often lose their intellectual tastes, and even the tranquillity of honest consciences, amid the consuming activities of an age of great material and political progress. The charms of domestic life are unexperienced or forgotten by an increasing number of men and women; while unattainable ideals fill many souls with nameless longings that make peace and contentment almost impossible.

But there is balm for all the foreboding sadness that

comes from contemplating such phases of life. It is not found in any ethical philosophy yet to be evolved, but in a sound, saving, ethical common-sense. Happiness and misery are complementary, like the imponderable light and darkness, heat and cold. The raptures of love, the supreme joys of creative activity, suggest higher and unexplored fields of happiness; on the other hand, the exquisite tortures of genius in morbid, secretive souls, like Keats's, Brontë's, Guérin's, who have "felt an inward misery growing on them till they dare not look within," are morbid and morose, full of intimations of profounder depths of woe. Psychology knows no reason, unless it be found in the backward state of ethical science, why the heart should be deemed less capable of culture than the mind; why sorrow and grief are not as often inexcusable as ignorance or superstition; or why it is not as imperative for the moralist to find joy and beauty, as for the scientist to find order, in the world. We are as naturally impelled to hide our wretchedness as our defects of mental culture. No one can be always or perfectly happy; but joy is positive fulness of being, sadness is negative and repressive. Each condition enhances the other; and the two often co-exist in the same soul, — happiness, as conscious attainment and atonement, as faith in an evolution which is slowly but surely accomplishing before our eyes all worthy ideals; sorrow, as an "instinct of perfection." A famous dictum of Hegel's is, that "The progress of the world is measured by its growth into the consciousness of freedom." If this be so, freedom and happiness must coincide; for the latter is the best criterion of ethical growth. Only he who is perfectly enfranchised from authority,

—at least, in some particular sphere which may be ever so narrow,—who becomes at last able to say, “Here no one can teach me any thing more;” he who has invented or created something new in the world, and far more he who has passed beyond all selfish hope or mortal fear,—he alone knows the perfect liberty of the sons of God. It is only souls thus liberated who have come to feel the primitive force of “that unsleeping secret sense” that is ready to sacrifice all, even the individual being itself, in the pursuit of hidden, unknown good,—that experience “the perfect joy which lies in a full self-sacrifice.”

THE MUSCULAR PERCEPTION OF SPACE.

THE question of the origin of space-perception has assumed quite a different form in Germany from that which is traditional to the English psychologists.

The intuitive school, Hegel alone excepted, have always held with Sir William Hamilton, that it is "truly an idle problem to attempt imagining the steps by which we may be supposed to have acquired the notion of extension." Yet it is precisely this problem that, during the last few decades, has become the centre of most psychological investigation in Germany. In this new direction of thought is involved, to some extent, a change of philosophical base and method. So suggestive are the new facts which have already crowned its researches, that the growing school of Ideal-Realism begins to hope for an entire re-statement, if not, indeed, a partial solution, of the *Wissenschaftslehre* itself. Re-acting from the world-bestriving generalizations of the system-builders of the heroic age of German philosophy, and working with a true analytic microcosmic zeal, more to be expected under the influence of Berkeley than of Kant, and none the less truly philosophical because led by physiological specialists, the new method has at least impressed one wholesome

moral. Henceforth philosophers must beware of such words as "simple," "immediate," "necessary," "ultimate," on the one hand, and "inconceivable," "impossible," "unknowable," on the other, as applied to any forms or products of thought.

Every muscular contraction, with which the most rudimentary known psychic elements of space-perception appear to be somehow connected, consists of a very complex train of material changes. Which of these give rise to the feelings of fatigue and tension, and to the knowledge of the position of our limbs? Some have believed these sensations to be due largely to the skin. Van der Kolk observed that when a mixed nerve sent motor fibres to a muscle, it very often sent sensitive fibres to the overlying skin. Schiff¹ ascribes muscular sense in part to the pressure of the belly of the contracted muscle upon the inner tissues of the skin, its stretching, and to the friction of its moving ends against surrounding softer membranes. Even rheumatic pain, according to Schiff, is seated in morbidly sensitive cutaneous nerves. The movements of the eye are brought to consciousness by nerves surrounding the bulbus. Folding, stretching, or pressing the skin near the joints gives rise to sensation of motion in the limb. Leyden² observed that if the skin was fully etherized, although difference in weights could be estimated with great accuracy, there were motor disturbances, arising, no doubt, chiefly from a diminished sense of position in the limbs. On the other hand, Bernard³ stripped the skin from the limbs of a frog,

¹ Muskel u. Nervenphysiol., pp. 156, *f*.

² Virchow's Archiv, Bd. 47.

³ Physiol. du Système Nerveux, I., p. 261.

and found its powers of swimming were not affected for some time, till, owing to the action of the water, the irritability of the muscles and the excitability of the nerves were lost together; while, if the sensitive roots of the sciatic nerve are cut, all the animal's movements become immediately ataxic. Again, it is urged by many physiologists that the Pacinian bodies, lying abundantly as they do about the joints, with the delicate leverage of their capsules, may give us no inaccurate knowledge of the position of our limbs, and even the tension of our muscles. It is quite possible that they contribute to muscular sense; but that they do so only incidentally, we may infer from the fact that they are found in the mesentery and along the intercostal nerves, where they cannot have this function, and from the general mode of their distribution and the degree of their sensitiveness.

That touch and muscular sense are very intimately connected in every form of animal life, and that the former often acts vicariously for the latter, must be fully admitted. The skin is also very sensitive over those parts which admit of the greatest variety and freedom of motion. But that no kind of cutaneous manipulation can give rise to any kind of muscular sensation, almost all observers are agreed. The points where the skin is most sensitive to discrimination of pressure, the forehead, lips, cheeks, etc., are by no means those where muscular sense is most acute. Weber concluded that we could distinguish differences of one-fourth in weight, and only one-third in pressure, upon the skin; but it may be safely said that, although others have reached quite different results, no one has yet entirely eliminated elements of touch from experi-

ments upon muscular discrimination, whether produced by active or passive movements.

Some investigators, especially Wundt,¹ make the chief elements of muscular sense central instead of peripheral, ascribing it to a feeling of innervation. We have a more or less immediate sense of force, it is said, the various degrees and directions of which are distinguished, and also associated with experiences of different kinds of movements, and which, perhaps, if it be volitional, is directed by an ideal representation of the movement intended, and of which, after it has been executed, we receive more or less accurate tidings from the sense of touch; while, from the time which intervenes between the act of will and the resulting modifications of peripheral sensation, further details of tension, resistance, and rapidity of motion, are inferred. The hypothesis of a feeling of innervation as an ulterior explanation of most, if not all, of the facts of physiological psychology, we regard as marking one of the most important epochs in the history of philosophy.² Even as crudely conceived by Schiff, it is a constant function of muscular sense, which nevertheless contains elements quite as specific and distinct as sight itself, and conditioned directly by the state of the muscular fibres. Reserving for the present the discussion of this point, we will only mention here the important experiments of Bernhardt,³ who found that we could distinguish weights nearly as well when the muscles of the arm

¹ *Physiologische Psychologie*, pp. 238, *f*.

² Prof. William James's able and ingenious argument, that the sense of muscular effort proceeds from afferent nerve-action or from motion as effected, seems to us to omit important factors of the question, and to be by no means conclusive. See *The Feeling of Effort*, in the anniversary memoirs of the Boston Society of Natural History, 1880.

³ *Archiv für Psychiatrie*, 1872.

were contracted by electricity as when they were stimulated by the will, and the fact that even the pains of cramp, tenesmus, colic, etc., which have no conscious innervation, are not only felt but are of very distinguishable degrees of violence, as, for instance, in the peculiar case of hemicrania, which long ago led Du Bois-Reymond¹ to assume the existence of sensitive fibres between those of the muscle, and irritated by them.

When we remember how constantly sleeping or waking consciousness is modified by the state and action of the visceral organs, and then reflect that the muscles constitute about one-half the bulk of the entire human body, and that, according to the computation of Helmholtz, one-fifth of all its energy, measured by foot-pounds, goes out in muscular work, we may fairly claim, without exhausting the method of exclusion with all its asserted proxies and auxiliaries, that the presumption is strongly in favor of a special muscular sense. More recently, however, its existence has been placed almost beyond doubt by the classic experiments of Carl Sachs.² The anterior sciatic roots of a frog were severed upon one side; and, after twenty-four hours for recovery, the animal was made as sensitive as possible by a subcutaneous injection of strychnia. In this way even the fall of a pin upon the table several feet off, or the voice of the operator, is often sufficient to cause the reflex cramps which are to be used as indices of the irritation of sensitive nerves. Upon the motionless limb, the long sartorius muscle, chosen because its nerves are mostly near the centre, is dissected out upon an isolating plate of glass till it is connected

¹ Archiv für Anatomie, 1874.

² Archiv für Anatomie, 1874.

with the body, which is still further protected from irritation by an envelope of blotting-paper, only by its slender nerve-fibre itself. Du Bois-Reymond had shown¹ that the strongest irritation of a motor root causes little or no effect in an animal similarly prepared. Sachs, however, found that very slight irritations, first by electricity, then by ammonia (which stimulates only muscular fibres), applied at the nerveless ends of his preparation, caused reflex convulsions over the entire body of the frog; which must therefore, in the latter case, be caused by the contraction as such. The physiological proof of the existence of centripetal or sensitive fibres in the muscle itself, at least within the perimysium, could hardly be more complete. The present writer should, however, admit that his attempts to verify this experiment have been extremely unsatisfactory. To his knowledge, indeed, it has never been done.

The anatomical proof of the existence of special sensitive fibres in muscles was scarcely less conclusive. When motor roots are cut from the spinal cord, which is their nutritive centre, very striking microscopic changes take place in the peripheral portions, which have long been observed, the precise nature of which, however, is a matter of much difference of opinion among anatomists. The fibres are first inflamed, then shrink and shrivel, becoming dull and opaque, till finally, in from four to eight weeks, all distinction of parts is lost in a kind of fatty degeneration. After the effects of such a section, Sachs studied the minute ramifications of the nerve of the same muscle, and found that two out of about twenty of its fibres showed

¹ Untersuchungen über thier. Elek., Bd. II., s. 600.

no sign of the degeneration which had destroyed all the rest. These, he inferred, must therefore be derived from the posterior or sensitive roots. The converse experiment was far less satisfactory. This, however, should be expected. The section of the posterior roots must be made below the spinal ganglia, their nutritive centre; and it is almost impossible to make sure that some motor roots of the same muscle have not also been severed. Moreover, it is far harder to follow degenerate among sound fibres than the reverse. The course of the sensitive fibres may even be traced after they have joined the main trunk through its decomposing substance. And, finally, the sensitive roots after section are perhaps kept from decaying by streams of irritation from the intact motor roots or from the muscle itself, while no such conservative influence can pass from sensitive to motor fibres. Indeed, Colastine has found that there was no degeneration of the peripheral part after severing the olfactory nerve. Sachs finally succeeded in irritating the nerve-fibres singly, and found, that, while most caused the muscular fibres with which they were connected to contract, a few had no such power.

In 1872 Odenius, and a few months later, though independently and by a quite different microscopic method and more minutely, Sachs, traced and described these supposed sensitive fibres, and found them the same for all vertebrate striped muscle. They leave the large motor trunk, and, instead of ending like its roots very soon after entering the muscle in short, blunt, medullated, dichotomizing stems, they soon lose the medullary sheath, and, running over long spaces of intersti-

¹ Archiv für Anat. u. Physiol., 1875.

tial tissue, end, sometimes by turning loosely and irregularly about the outside of a primitive bundle, like a tendril, following its course for some distance, sometimes after countless dendritical branchings by being lost in the meshes of connective tissue or the sarcolemma, while sometimes, after meandering freely between, they appear finally to enter the muscular fibres themselves. These minute pale soft fibres, sometimes given off in considerable numbers, often anastomose, and seem to end in plexuses or even in irregular loops, although Sachs was rarely certain that he had found a veritable fibre-end. That he did so, seems highly improbable; for mineral or acid re-agents, as he himself admits, are very apt either to destroy or fail clearly to stain fibres of less than .001mm. in diameter. Odenius could find no real division of the axis-cylinder, which he believed with Schultze to be itself composed of fibrillæ. After losing the perineurium together with the medulla, the enclosing membrane often cannot be distinguished from its contents, so delicate is it. After their primary and secondary divisions, the course of these fibres is often marked by very peculiar round or biscuit-formed bodies, probably not gangliar in their nature, and not so much interrupting the continuity of the fibre, as springing from its sheath, though many times its diameter. Finally, it should not be forgotten, as an additional proof that these are really sensitive fibres, that they have been found to be most numerous in the muscles of the eye.

This hasty sketch of the present condition of the question of muscular sense brings us to our first inquiry, viz., how do the changes caused in a muscle by motor innervation excite its sensitive fibres? If we

wind a string in several spirals about the chest, and inhale a full breath, it will slip about four inches for each of the coils, which will be drawn slightly nearer each other, while if the string be thoroughly acoustic we can hear the muscular tone with a simple arrangement at the other end. This, like most illustrations, although it conveys a general notion of what takes place, is yet wrong in every detail as an image of the action of a sensitive nerve. The coils by which it encircles the belly of muscular fibres are extremely irregular. Often its course is parallel to them, and sometimes the direction of the coils is reversed, many minute threads passing off more or less diagonally. If these fibres stretch during contraction with the increasing diameter of the fibres they enclose, and if this form of irritation is the immediate datum of the conscious sensation of motion, then either the latter must *infer* one dimension of space from another, the motion of the limb from the swelling of the muscle, or else the inherent difference between the psychic and the neural *aspect*, or "infinitesimal event," involves at bottom that between one dimension of space and another more magnified. The same would also be true of fibres running transversely across a large number of muscular bundles. But the chief change is a diminution of length. In most muscles, owing to their form, this is several times the change in their diameter. Indeed, an ordinary muscle, if isolated, may often shorten three-fifths of its length, while the fact that the course of a sensitive nerve is so much more extended after leaving its motor trunk than that of the motor roots themselves, indicates that it can shorten with and like the contractile wave; while if, as would seem to be the case, the

motor branches end, not only more briefly, but nearer the centre of the muscle, they would have almost entire immunity from the systematical shortening. Furthermore, it seems possible, from Sachs's isolated irritations, and from the gradual increment of the first stage of ascent in the muscle-curve, that the waves of contraction in the different fibre-bundles do not actually coincide, some fibres beginning to contract a little before and some a little after the instant when the index rises from the abscissa-line on the revolving cylinder. Thus, in case of a nerve in contact with both a pre-punctual and a belated contractile fibre, the intensity of the above mode of irritation would be vastly increased.

These, then, are the psycho-physical factors of what we shall call the *first* muscular sense. We have seen motion in the terminal organ directly transferred to nervous elements with less change than a sound-wave undergoes in being reproduced in the nerves of Corti's arches, or on the recording cylinder of a phonograph. It is from such neural modifications that we get what Bain somewhat inaccurately calls the "sense of range." We may weight or fatigue our hand, or force it into any unnatural position, and yet we can make a dozen marks with a pencil, of any prescribed length, with nearly as much accuracy as in the natural way, so thoroughly is this sense intellectualized or abstracted from other muscular feelings on the one hand, and from the more immediate sensation of shortening fibres on the other. That it is isolated from the former, we regard as one of the most conclusive proofs that innervation is as inadequate to account for the details of muscular sense or feeling, as a father's account of the

time and amount of remittances would be as a record of his son's expenses.

Measurements with muscles immersed in fluids have shown, according to some observers, that they may undergo a diminution of volume amounting to less than one-thousandth of their bulk during contraction. Others have denied this. It may be remarked, however, that if it be true it follows that as they are composed of three-fourths water, which the greatest pressure can reduce only about five hundred-thousandths, it is evident that there must be considerable change in density of their more solid substance. This is easily felt in the hardening of contracted tissue, and varies with the degree of tension or resistance, rather than with the amount of shortening, and may be approximately measured by increased blood-pressure. Any such change would, of course, be greatly augmented along the crest of each wave of contraction, near the contractile elements; and, in a substance where every tissue must be more or less strained, as the fluid conformed to the law of hydrostatic pressure, those that were softest would suffer greatest change of form. Along the track of the sensitive nerves, apparently attached to their sheath and not interrupting their course but easily slipping over their surface, are the oval or spindle-shaped bodies¹ above mentioned. They appear enclosed in a hyaline coat, and with a semi-transparent, granular, rather than cellular, content. The finer structure of these pads, although they are very large compared with the fibres they enclose, is entirely unknown. Now, may they not be analogous to the tactile corpuscles in structure, though adapted here in the centre of the

¹ Archiv für Anatomie, 1874, pp. 666, 667.

muscle to respond not so much to contact as to pressure? Sensitiveness to weights when lifted follows the same psycho-physical law as weights estimated by cutaneous pressure, with this remarkable coincidence. At the lower end of the former series, up to three hundred grains, Fechner found an increase of discriminative sensibility, which he was entirely unable to explain, except by suggesting an analogy with the immense increase of sensitiveness near the threshold of the touch-scale, known as the phenomena of tickling,¹ where, up to a certain point, mechanical compression of the terminal substance diminishes sensibility. Further than this, both alike are inexplicable. If we suppose that, in a free unloaded contraction, a less number of fibres actively shorten than when there is great resistance to be overcome, then the number of these bodies irritated, as well as the intensity of their irritation, may help our discriminations doubtless in the perception of weight far more than in feelings of range or fatigue. How independent this *second* muscular sense is, appears in the fact that it makes no appreciable difference in the accuracy with which we discriminate two weights, whether we lift them through five or through twenty inches, or, within certain limits, whether we are fresh or fatigued. It is to this sense mainly, that we owe the conception of force, the origin of which empirism could never otherwise explain. If the first muscular sense gives us the data for the perception of empty space, it is this which makes possible the knowledge of matter, as occupying space, resistant, acting upon us. Though less endurable, recoverable, and independent of the actual presence of

¹ *Psychophysik*, I., pp. 182, *f*.

objects, than the "sense of range," it is perhaps no less susceptible of culture, as we may see in the familiar case of the postman, who judges with great accuracy whether a letter weighs more or less than half an ounce.

That the above are the respective physical conditions of the two spacial sensations of muscles, is made still more probable by the fact that all other known changes in a muscle during contraction either lack the necessary degree of concomitancy, or else the interval between the threshold of sensation and that of pain, in which every kind of perception is lost, is too narrow to be assumed as a basis of such wide ranges of sensation. Heat, for instance, is mainly produced during muscular contraction; but no degree of heat or cold, even though causing the muscles to slightly stretch or shorten,¹ awakens any sense of motion or resistance. Even the skin, which is exposed to far greater ranges of temperature, can discriminate differences of only about half a degree. The amount of heat produced by muscles is not a measure of the work they do.² It is given off more rapidly with the same amount of rise near the summit than at the base of the muscle-curve.³ Whether, then, all the nervous and other forces causing contraction become heat on their way to external work, or not, has no more to do with the sensation of the latter form of motion than with the action of polarized light on the cross-plates. Here, at least, there is no reason to believe we *infer* molar from a feeling of molecular motion. The same may be said of acids and other products of decomposition, which, by acting on

¹ Samkow, Arch. f. d. ges. Physiol. IX.

² Flick, Beiträge, § 156.

³ Nawalichin, Archiv f. d. ges. Physiol. XIV.

the almost naked axis-cylinder of the assumed sensitive nerves, probably cause the sense of muscular fatigue. This feeling is, no doubt, closely correlated with that of innervation; but our judgment of motion or weight, instead of conforming to the curve of fatigue, is, up to a certain limit, scarcely affected by it, while, if the sensitive data were the ratio between processes or products of nutrition and retrograde metamorphosis, then, again, the psychic verdict in any given case would be either infinitely complex or else fluctuating with every change in its physical basis. So, too, of the more painful and indiscriminating muscular feelings, such as excessive fatigue, cramp, etc. Whether these are located in the tendons, as Wundt believes, or depend upon the extent of gray tissue involved in their conduction, as Burkhardt conjectures, or, as many anatomists suppose, are caused by lesion of tissue or of nervous anastomoses in interstitial tissue itself, or by mere excess of the same causes as in normal activity give us true muscular sensations, — it is enough to assert their undisputed psychic independence in kind.

Finally, we may add, that, while the latest anatomy of muscular fibres suggests the presence of yet more ultimate nervous elements peculiarly adapted to irritation by tension and pressure, our conclusion is not likely to be affected by any solution of such outstanding questions of myophysics as the pre-existence of muscular currents, the presence of a parelectrotonic layer, the number and nature of cross-disks, etc. Gerlach¹ believes that the fields of Cohnheim, which are light-colored demarkations of primary bundles of

¹ Berlin. Klin. Wochenschrift, No. 45.

muscular fibrillæ seen by cross-sections, are due to nervous substance which must be conceived as spread over the single sarcolemmal elements as a perfect sheath. Engelmann's¹ ingenious theory assumes that the anisotropic or doubly refracting substance is the seat of contractile power, and acts by filling itself with fluid to two or three times its former bulk, while he has observed the isotropic substance to shrink and shorten, sometimes as much as eighty-five per cent, the former growing bright while the latter is growing dark, thus accounting partially for the homogeneous mid-stadium of Merkel. Such changes are far greater than those which take place in the fibre as a whole; and if these are immediately recorded upon sensitive nervous tissue it must be by pressure and tension as before, but vastly augmented, and still furnishing the required extensive and intensive series.

Muscular sense is thus absolutely unique in that the incommensurability between the form of external excitation and subjective sensation found in every other sense does not exist here. It is the motion of the limb, the muscle, the nerve-end itself, which responds by the feeling not of heat, light, or sound, but of motion again. This sense is not a mere sign of some unknown *Ding an sich*. Movement, as perceived directly by consciousness, is not even found heterogeneous in quality when perceived indirectly by the special senses of sight and touch. No degree of subjective or objective analysis, though it may simplify and intercalate any number of forms, can change its essential character as motion. This, together with its entoperipheral nature, gives it a high degree of non-inferential imme-

¹ Mikroskopische Onderzoekingen, II., 2.

diacy, *à priori* to the action of any special sense. We can thus strictly say of muscular activity, what Schopenhauer¹ asserted of our knowledge of the whole body, though in a much stricter sense than his.

In man the muscular sense is only rudimentary. Its sensitive fibres are best studied in the lower vertebrates. Before and during the development of sight and perhaps touch, which have largely superseded it in man, it must have played a very important part as the chief sensation of animal life. If we assume a nervous system, made of relatively simple arcs and centres, a reflex act would originate with the irritation of a sensitive fibre. This might be very slight: whether or not the fibre itself add to the intensity of the irritation, the ganglia through which it passed would augment the disturbance, and the contraction of the muscles at last, besides being an explosion far greater than can be explained by the amount of irritation, would also, in the lower forms of life, modify or perhaps even convulse the organic processes of circulation, digestion, etc. Thus we may conceive that the first sensation would rise above its threshold, out of the general reverberation of nervous shocks and pulses, during the muscular crisis of a sensori-motor process. The sense of motion was probably the first as well as the most immediate of all the senses which we have or can directly reproduce.

The experiments of Exner² tend to confirm this view. He found that the direction of a moving point of light could be seen in less than the smallest interval of time that could be distinguished between two successive points of light, in different parts of the retinal field.

¹ Welt als Wille u. Vorstellung, I., § 18.

² Wien. Sitzungsberichte, Bd. LXXII. 3, and Pflüger's Archiv, 1875-6.

There is an interval where, while each spark is seen in its place, motion is seen between them, as if one would spring over to the other, and only from the direction of this motion can it be inferred which spark appears first. Moreover, the peripheral retina often sees motion as such with hardly any perception of form or brightness. This is partly cause and partly effect of its feeble localizing power. This quality of the eye is more and more pronounced as we descend the scale of animal life, till we reach the faceted eye of insects which see almost nothing but motion; their vision being, as he concludes with Müller, mosaic, while the refractions of the anterior media are so confusing as to deprive them of any adequate perception of form. Certain kinds of motion, he believes, have negative after-images. From this he concludes that the eye, so to speak, tends to see successive impressions as motion where none really exists. Vierordt,¹ also believing that motion is not a perception but an immediate sensation, not implying any inferential knowledge whatever of time and space, enumerates a number of false sensations, persisting against adult insight, which he regards as accidentally uncorrected residua of primitive and pure sense-impressions. If, e. g., we move the little finger to and from the rest, the latter seem to move; if we draw the point of a stick across the back of the hand while the arm is extended and unsupported, the hand itself seems to move against the stick; if we hold the end of the finger motionless against the forehead, and shake the head, the finger seems to move, etc. The content of these motor feelings is far different from the developed form of actual or visible space. It is a

¹ *Zeitsinn*, 1868, and *Zeitschrift für Biologie*, XII.

mere *nicht-zusammenfließen* of the yet more elementary series of sensations of which they are indissolubly composed, while both rest and punctuality are inferences. It only remains to trace the process by which the child comes to objectively interpret and measure these vague and isolated motor feelings. The author thus postulates a nativism which grants not only that there is nothing spacial in the intellect which was not first in sensation, but also that sensations may themselves be indefinitely compounded of psychic minima, each, however, having the spacial *quale*.

But it is not merely in these lower and exceptional forms, or even as dependent upon sensible muscular fibres, that motor feelings exist. While out of the sensations of pressure and tension which follow arrested motion, arises perhaps the first rudimentary perception of an external world, developing from general epi-peripheral feeling into the special senses with ever-increasing discriminations and extraditions,—reactions also, increasing in complexity, specialty, and seriality, have not ceased to respond, in a generic and diffused way, to every changing shade of sensation.

It is probable that there is a constant influx of nervous energy into the muscles.¹ In reading Hermann's ingenious experiments, it is impossible not to be impressed with the fact that the current he fails to observe may either be so weak or so absorbed by inner work as to elude his most delicate measurements, just as supposed electrical changes in nerve-fibre concurrent with sensation are far beyond the reach of any galvanometric test. If there is a pre-existent constant current in the muscles, it is thus probable that it enters along

¹ Bain, *Senses and Intellect*, § 25.

the highly conductive nerve-tracts, as the electrical organs of fishes are charged from the terminal plates. Again, although it is proven that under certain circumstances nerves may conduct both ways, and that sensitive and motor functions may even be exchanged, there are abundant indications that centripetal and centrifugal functions are never indifferent. In glands, which in many respects are similar to muscles, regular electrical functions have been proven, indicating that stimulation from the nervous centres is constant.¹ The fact that, of two nerve-muscle preparations, the one with the longer tract of nerve attached dies first, seems best explained by assuming some sort of current from the nerve flowing into and exhausting the muscle below the extremely variable threshold of contractile excitation. The fact of muscular tonicity, then, is best explained by assuming such a current identical, or more probably concomitant, with electrical changes.

This motor innervation, commonly perhaps rising to changes of muscular tension, responds to every variation of sensation. Thus we may explain the great increase of blood-pressure following the irritation of sensitive nerves.² How irrepressible such reflexes are, is best seen in the subtle muscle-language of gesture, facial expression, inflection, etc. How wide a range they have had in the past, we see in imitation and pantomimic speech, and perhaps in the animism of primitive races who imitate the movements and forms of external objects till, by a vivid imaginative transference, inanimate things seem living beings like themselves. How unconscious it may be, we can infer

¹ Rosenthal, *Muskeln u. Nerven*, pp. 208, *f*.

² See Carpenter's *Mesmerism and Spiritualism*.

from "planchette," table-tipping, the divining-rod, etc. How minutely and accurately these changes may be perceived even in others, may be seen in the phenomena of mind-reading, and the game of "blindfold-seek," as well as in automatic gestures of all sorts. How impossible absolute immobility is in tonic muscles, may be seen in fixating a star of small magnitude, which we shall find to twinkle more and more obviously because attention has made the muscles of the eye more tense and therefore more tetanic, so that the eyeball swerves as the phases of their vibration interfere and coincide, the ray falling now on, now between, the sensitive elements of the retina. For such a protocol of facts—to which we might add those diffused sensations which give us knowledge of the position of our limbs, the feeling of general muscular vigor or languor, the soothing sense of rest, and we know not how many more, very low in the scale of ideal recoverability, of specific qualitative character and localization—every punctual or non-spacial theory of the soul affords no rational heuristic. Colors and tones would mix, as Fechner well urges, were it unextended. Neither can we call the brain alone the organ of mind. We could rather believe with Professor Bowen in "the omnipresence of the thinking self, one and indivisible in the whole organism."

The Association-philosophy has taught us how indissolubly the terms of a psychical synthesis may be welded together till what is in fact the result of generations of training or experience appears simple and innate. *Abiunt studia in mores*, is the formula of all mental growth. It is the very law of intelligence, as of nature, to conceal or destroy the stages of its own

development by consolidating and then relegating to lower centres long processes once conscious, so that the psychologist is confronted, not merely by missing links, but by what seems an impassable chasm between the phenomena of matter and those of mind. It is the converse of this process, however, which we hold to be of prime importance for the theory of space-perception. As what was once a conscious act may now have become secondary-automatic or even reflex, so what was once a pronounced muscular effort, semi-convulsive it may be in intensity, is now abridged to a mere form of motor-ideation, the neurosis of which is an innervation perhaps below the threshold of every form or degree of muscular contraction or tension. It seems not impossible, as we shall see later, that this abridgment or repression or elimination of provincial or eccentric co-operation may be carried so far as to be quite independent of the existence of muscles concerned. "The degree of consciousness is inversely proportional to the amount of external diffusion in action."¹

In accordance with this are the well-known views of Hughlings Jackson,² that the units or substrata of mind are sensori-motor processes. In reproducing a word in consciousness, e.g., not merely the auditory but the articulating centres are concerned. Not merely are all visual impressions in fixed association with certain ocular motions, but our idea of an object, as a ball, however indistinct, is made up of impressions of surfaces and ocular adjustments. As our ideas of the primary qualities of matter, size and form, are acquired only by motions, motor centres must act if we see or

¹ Ferrier, *Functions of the Brain*, p. 286.

² *Clinical and Physiological Researches in the Nervous System*, I.

think of material objects; while sensations alone are known only indirectly, and can give us but the secondary properties of matter. Bain asserts that in every thing that concerns visible movement and form, the muscle-consciousness is the inseparable element; while Lewes concludes that every psychical fact is a product of sense, brain, and muscle-work. Wundt lays essential stress upon the fact that attention involves motor activities;¹ while Ferrier's experiments may be said in a general way to have identified the centres of consciousness and of motion.

How inexpugnable motor elements are from what we are wont to regard as the simplest sensations, almost countless optical experiences, beginning, for instance, with the Donders-Listing laws, might be cited to show. Helmholtz² argues that the mind neglects and loses in its development every element of sense-perception that it cannot utilize in the knowledge of external objects, especially intensity, which is inversely as perception; so that a pure sensation can only be brought to consciousness by ingenious artificial means. All possible *truth* is practical. To ask whether our conception of chair or table corresponds to the real chair or table apart from the uses to which they may be put, is as utterly meaningless and vain as to inquire whether a musical tone is red or yellow. No other conceivable relation than this between ideas and things can exist. *The unknowable is what I cannot re-act upon.* The active part of our nature is not only an essential part of cognition itself, but it always has a voice in determining what shall be believed and what rejected.

¹ *Physiol. Psychol.*, p. 793.

² *Physiol. Optik*, pp. 431, 443.

Thus at length we are brought to our first thesis, which is, that, on the basis of such researches as have been enumerated, we are now warranted in assuming that every sensation of motion is itself spacial. The burden of proof, indeed, now lies with those who assert that because space is the logical *prius* of motion it is added to or imposed upon non-spacial sensations as an intelligible form by the mind. It will at least be evident why we claim for the psychologico-genetic aspect of the space-question absolute precedence over the metaphysical. It is true that space by no means implies or necessitates motion; but it is impossible even for an adult analytic mind to conceive of motion without space. The feeling of motion, we have shown, is the simplest, earliest, most universal known psychic rudiment of animal life. It is distinguished from every other sensation in being identical with its objective cause or aspect, which is also motion. That motion felt is not the same as motion seen, is of course admitted. The external existence of what is imaged on the retina as a moving limb is far more indirect and inferential than the relatively immediate muscular sense of that motion. A state of rest in our own body or in external things, the perception of any defined and static form whatever, and most of all the very possibility of unspaciality or punctuality, must be subsequently inferred as negative instances from indeterminate extension and movement. These, indeed, for an elementary consciousness which rises above its threshold only during crises of bodily activity, would be nothing more or less than abstract transcendental deductions.

A man moves his foot, and the impression of swelling, shortening fibres, is transmitted through five feet

of nerve-fibres to a sensitive point in the brain; and there we may suppose the motion of the foot, in an entirely different plane and dimension of space, is inferred. But, if we may imagine any first sensation to arise in some simpler form of animal life, it would be there unrelated and alone in its new, vacant, but conscious horizon. It could have no quality even of pleasure or pain, no reference to any thing before or after; for these imply comparison and relation. There would be only a vague area of nerve-muscle substance, feeling its own motion as it moved. Its changes of form would be isomerically identical with its change of state. No matter whether we regard the psychical factor as the centralization of a more diffused sentiency about the seat of greatest or more heterogeneous changes, or conceive the whole body made a sensorium by a sudden multiplication of disturbance or shocks, extending to its more and its less stable molecules alike. The materialist might prefer to say the molecular registers or "perceives" its molar equivalent of motion, as, e.g., heat registers foot-pounds. We, however, choose to say that the soul-life, whatever its nature, begins, so far as its origin has yet been traced, in contractile tissue; and that, before discriminating parts, form, limb, position, — occupied from unoccupied space, or even an external from an internal world, — it has an intuition of undefined extension more absolute and immediate than any other. There is a reciprocity, a direct envisagement, a dialectic indifference, in fact, of organism and intellectual function. *If subject is not one with object at some point in primordial space-perception, it must remain eternally divorced from it in all the derived unities of external*

perception or reason. Here alone, though in a spacial respect only, subject, as it were, concurs with, is coincident with, pervades, object. They are not yet distinguished or drawn apart, each by its own different cohesions and associations with members of their own series, until, though primarily of the same essential nature, each becomes more and more exclusive of the circumscribed aggregate of activities which makes up the other.¹ Each may here be conceived as indifferently content and background to the other.

If there is an unbroken succession of nervous changes as a material condition of sensation, no matter how variable the ratio between the two, then spaciality is as inseparable an attribute of motor feelings as of force or matter. This *tertium quid* of equipollency postulated at some point in the history of organic life is indispensable for any psychological theory of the origin of space-perception which establishes at the same time its objective validity.

That there can be no pre-spacial motor feeling, — that, just as all knowledge becomes sensation when viewed from a higher standpoint, so muscle-sensation contains an element of cognition of its own bodily substratum, in which certainty may be almost inversely as exactness, — we may now assume as evident. It is also plain that the primitive and generic form of sensation just characterized, in which we believe the full solution of the space-question to lie, as it were, pre-formed in embryo, must be evanescent. New sensations would follow, arising from new relations. Comparison and repetition would add intensive quality to the mere sense of formless extent. Instead of being

¹ See Spencer's Psychology, vol. i., part ii., ch. 1.

only empty forms of self-assertion, experience and elaboration would make them into signs of external activities. As conducting fibres and sentient cells become more distinct and more numerous, psychical life, which we may conceive as beginning in muscular substance, would retire from muscle to nerve, and from nerve-fibres to nerve-cells, or rather ascend and unfold in these more special organs. Almost every property possessed by nervous is now found in muscular tissue, and *vice versâ*. Hermann¹ finds slight electrotonus in muscles, and Tschirjew² has proved their independent irritability, and also that nerves, like muscles, are irritable transversely. Both exhibit like phenomena of pulses of negative variation. With two or three exceptions, partly explicable on mechanical grounds, all poisons act on them similarly. Hällstén believes the axis-cylinder to consist of protoplasm, capable of a peculiar wave-like motion. Over against these analyses the chief difference, besides that of bulk, appears to be that the active elements of nerves are enclosed in relatively thicker and more resistant substance, which fits them to conduct isolated currents of disturbance; while in muscles the interstitial tissue is relatively flexile, and conforms to the motion of the active elements, causing contraction.

Be this as it may, suppose all sentiency relegated from muscles to the nervous system alone,³ and irritability and sensibility distinguished and separated. Even then we might, if disposed, fall back on Brown-Séquard's⁴ assumption that, because the length of the

¹ Pfüger's Archiv, VI.

² Archiv für Physiologie, 1877.

³ Lewes, Problems of Life and Mind, 2d Series, p. 221.

⁴ Lectures on the Physiol. and Pathol. of the Central Nervous System.

twitch of the secondary muscle is increased by overloading the first, muscular sense must be caused by negative variation; or we might with Gubler, who regards recurrent sensibility as a reflex phenomenon, prefer to assume a nervous circuit completed peripherally by intermediate cells, like the gray matter of the spinal marrow diffused and dissociated.¹ A complete neural circulation, however, is by no means the necessary condition of a sensibility independently located in eccentric portions of the human body such as Mr. Lewes supposes. It is, of course, possible that sensation accompanies the isomeric wave as it runs through the fibres, but it is certainly no less probable that it accompanies the chemical changes thus caused in central cells. If the hypothesis of specific sensibility assumed also uniformity in the centripetal wave and its rate, and if sensation occurs only in cortical cells, then they could, of course, be distinguished only by local signs minutely differentiated over the three hundred square inches of gray substance upon which their irritations were projected. But it is far less probable that sensation is thus immediately and discriminatively cognizant of molecular neural processes, than that the inseparable motor impulses which attend every form of external stimulation are the immediate cause or objects of sensation. Wundt has shown how every form of reflex re-action is strongly inhibited by attention; but that the incipient motor impulse, though repressed, is never wholly eliminated, is no less certain. If the connections between sensory cells are excited, activities chiefly inhibitory are caused. Inhibition, however, is not the destruction, but the storing-up, of energy; and is

¹ See Vulpian's *Système Nerveux*, pp. 144, *f*.

attended not by the discharge, but by the increased tension, of relatively large and strongly-acting motor cells, whose connections with each other are mainly summative.¹

The conclusion which we thus reach harmonizes in the main with the deductions of Trendelenburg, though we cannot see more than an analogy between the movement of thought and material motion; and though we can by no means admit that space is primitively inferred as a mere external condition of motion, yet it is certain that all attempts to derive or construe motion into non-motive terms are idle. Movement explains all things. Molar is explained by molecular, known by hypothetical motion; while motion, by which all things are known, must itself be self-known.²

In fine, then, we believe it demonstrated, in a sense far more fundamental than that conceived by Bain, that empiricism is no more able to explain space than force without muscles; that sensitive elements of contractile tissue constitute the peculiar organ of a space-perception *à priori* to the experience of the special senses, and which it is theirs to elaborate externally and measure each in its own typical way. If this be true, physiological psychology is already able to challenge the dogmatic dualism of the scientific school of metaphysicians, who, assuming with Professor Tyndall that the essential principles of nature are already discovered, assert two series of events, each of the innumerable terms of which is at the same time indissolubly mated yet absolutely incommensurate with a corresponding term of the other series. This mild and ancient artifice,

¹ See Wundt, *Mechanik der Nerven*, 2te Abth., s. 133.

² *Logische Untersuchungen*, Bk. I., cc. v., vi.

instead of two, might have given us five worlds. If we assume the touch of two smooth substances to be respectively a right and a left-hand spiral motion, and the taste of two to be in the one case an acid, in the other an alkaline re-action, and so on with all the senses, there is a five-fold incommensurability. Instead of one, there are five, impassable gulfs, with no conceivable relation among them, save that of empirical association. Even so far as it is a matter of belief, we prefer to plight our allegiance to a programme of work yet to be done, though it were far more indefinite than it is, rather than to face a blank wall of nescience, whereon no other record can be read than that there the limits of individual development or culture were mistakenly and arrogantly asserted to be the limits of possible knowledge. Psychology is no longer content to hold belief in an external world as a mere act of faith or opinion. She postulates an ultimate Monism, and hopes one day to prove a rightful title to the bold nomenclature of the Identity-philosophy. Now, with true Socratic irony, she dares to take, for the most part, the attitude of ignorance towards an absolute philosophy, and a yet more absolute science. Whether she will disclose the Messianic function, and gladden the long travail of thought by new-dispensing the transcendent secret of reason incarnate in organic life, the far future alone can tell.

LAURA BRIDGMAN.¹

IN 1837 a delicate light-haired girl, nearly eight years old, who at the age of twenty-six months had lost sight, hearing, and to a great extent the senses of smell and taste, from an attack of scarlet-fever, was brought from her rural home in New Hampshire to the Perkins Institution for the Blind in Boston. During her long illness all recollection of her babyhood had been completely effaced. Her parents had communicated with her by the simplest signs addressed to her only sense of touch. A pat on the head expressed approval, on the back disapproval. She had been taught to sew, knit, braid, and assist in trifling ways about the work of a farmhouse. Dr. Howe began her instruction by pasting on common objects—chair, spoon, stove, etc. — their names printed in raised letters. After she had associated the name and the object, the labels were taken off, and she was taught to select the object for a corresponding name, and *vice versa*. After a few days, when she had thus learned a small number of names and objects, Dr. Howe gave

¹ The observations recorded in this paper were made just before the author went abroad in 1878, chiefly in search of light on questions of German psychology and physiology, and were written out in Berlin with the aid of a suggestion from Professor Wundt, respecting dreams; to whom the author would here express his thanks for the deep interest taken in this remarkable case.

her a pin and a pen, and made her feel his hands as he spelled from *disconnected* letters the two corresponding words. After repeating this process scores of times, she suddenly seemed to understand that the signs were complex, and must be observed separately; and at last she was able to select from a pile of letters those which spell "pin" or "pen," according as one or the other object was given her. This was an immense step. She was now easily taught the names of many other things, and to set up types of raised letters, and, impressing them upon paper, to produce a copy which she could read on the reverse side. After nearly two years of such exercises, she was taught words indicative of quality, as "hard" and "soft," and, later, moral qualities, commencing with the figurative use of the words "sweet" and "sour," which as tastes she could slightly distinguish. It was difficult to explain to her why these should precede the substantive, and especially so to make her understand general or abstract expressions of quality, as "hardness," "softness." Next she was taught words expressive of simple space-relations, "on," "in," "under," etc., and later and very easily the use of verbs expressing tangible actions, as "walk," "run," "sew," first in the present indicative, and then in other moods and tenses. Instruction in writing, which began at this point, was at first very puzzling to her; but when she suddenly caught the idea that thus she might communicate with persons whom she did not actually touch, her enthusiasm was great and her progress rapid. Counting, the divisions of time, the simple rules of arithmetic, and, later, fractions and the computation of interest, the elements of algebra and geography, etc., she has been able to comprehend quite clearly.

We have no space to epitomize further the history of her education contained in Dr. Howe's Reports, unfortunately now mostly out of print. His work was so ingenious and successful, that it still remains one of the greatest triumphs of pedagogic skill; and his studies of his pupil during the most interesting period of her education may be called almost classical for the psychologist. Few princes have had more devoted pains bestowed on their education. Besides Dr. Howe's personal and constant supervision, an accomplished lady-teacher, who has lately published an interesting sketch of Laura's life and education,¹ was engaged for years expressly for her. Laura's curiosity has always been boundless; and she is so demonstrative and affectionate, and so pitiable from the afflictions which have made her famous, that the number of her personal friends and acquaintances has become surprisingly great, while not a few ladies have learned the deaf-and-dumb alphabet mainly in order to converse with her. The philanthropic interest of Dr. Howe in his pupil (whom he described as living in isolation from all that is best in the intercourse with men and nature, as if at the bottom of a deep well striving to grasp the slender cord by which he at last slowly drew her up into the world of human fellowship) was contagious; and thirty years ago his annual reports of her progress were translated into several European languages, and read by thousands with an interest and a sympathy which has well been described as creditable to humanity. Her native modesty and conscientiousness, her remarkable cheerfulness, and love of every

¹ *Life and Education of Laura Dewey Bridgman.* By Mary Swift Lamson. Boston: N.E. Pub. Co. 1878.

sort of sport and play which she can understand, scarcely less pronounced now in the woman of forty-nine than it was in the girl of sixteen, the amazing rapidity with which she comprehends and uses the deaf-and-dumb alphabet (sometimes receiving through the hand of an expert teacher every word of a public address as it is given, with the loss of scarcely a letter), the decided enlargement of her head in the frontal regions during the early years of her education, her dreams in the finger-language, her curious and expressive vocal sounds, gestures, and facial expressions, the readiness with which she remembers old acquaintances after the lapse of years by the mere touch of the hand,—these and many other facts have been cited and commented upon by scores of writers until it is hardly extravagant to say that comparatively few comprehensive treatises in any department of mental or moral philosophy or psychology written in Europe or America during the last quarter of a century can be found without the mention of her name. Her education has of course always been chiefly in language; yet like all the blind, and still more those who are both deaf and blind, she is quite nominalistic in her modes of thought, and by no means a mere parrot or word-monger. A word to her, though not a mere *flatus vocis*, is yet only a representation of something definite, specific, and for the most part tangible. It has been often conjectured that intensity and range of emotion depend in some measure upon the intensity and range of the voice, the mobility of the features, etc. The capacities of the hand, physiologically the most objective part of the body, are so different as an organ of expression from those of the larynx, that, if

this be at all true, we can see here an additional reason why her strange consciousness is at every point so like yet so unlike our own, that we might compare the two as Mr. Herbert Spencer conceives things *per se* may be related to our perceptions of them, viz., as solid objects casting their shadow upon a cylindrical surface where lines and angles are all represented, but in such changed relations and proportions that there is an element of incommensurability between thing and thought at every point.

For years Laura was encouraged to write down every day her experiences, acquisitions, and reflections; and her teachers were also in the habit of keeping a diary of her progress. She has also at different periods of her life written three "autobiographies," two of which are mainly devoted to the recollections of child-life at home. She has had quite an extensive correspondence, and many of her letters have been collected and preserved by friends. Unhappily, very little of this copious material, except her own diary and the reports of Dr. Howe, has been used by Mrs. Lamson in her recent sketch. Through the kindness of Dr. Anagnos, the successor and son-in-law of Dr. Howe, it was all placed in the writer's hands; and the hospitality of the Perkins Institute for several weeks, together with all needed assistance and information, was generously offered for further observation and experiment. A preliminary sketch of some of the methods and results of these, it is now the object of the present article to give. Most of Laura's life has been passed in an atmosphere of womanly sympathy; and the question whether or not she should be submitted to the trifling inconvenience necessary to any psycho-physiological

study of her sensations, which may seem to some to bring humanitarian and scientific motives in conflict, appears quite impertinent when we reflect that perhaps no person living owes more to the kindness of her fellow-beings, and that few are less able to repay it otherwise.

During the first twenty-six months of her life, before the illness in which the contents of her eyeballs and ears were discharged by suppuration, she is described as a somewhat precocious child with light-blue eyes and an almost morbidly active and sensitive temperament, who had already learned a larger stock of words than most children of that age. Very many adults remember distinct events before the beginning of their third year, and several well-authenticated cases are on record of those who became blind from the sixth to the eighth year, and whose memory of visual conceptions and color-sensations has persisted through adult years. After carefully questioning her mother and other relatives who have always been interested in these questions, and after several short series of indirect and scores of direct questions addressed to Laura herself, with the request that she would "think hard" and answer in writing the next day, and after examining the three "autobiographies" in which she has at different periods of her life striven to recall all traces of early recollections, no reason can be found to believe that any thing whatever previous to the long convalescence, which extended from her third to her sixth year, has remained or can ever be recalled to her memory. Yet, when we reflect on the amazingly rapid self-education of infantile life through the senses and its fundamental nature, it is impossible to believe that its

effect can ever be entirely obliterated. In fact, we may recognize in Laura's strange and insatiable curiosity, especially about things which others see and hear, as well as in the suddenness with which insights have so often seemed to break in upon her mind, some sort of sub-conscious reminiscences flashing through the sad background of her childish recollections.

Of the next period of her life, extending to the end of her eighth year, when her education commenced, her memory has always been wonderfully full and complete. In the "autobiography" of 1854 more than forty large and finely-written pages are devoted to this period; and a comparison of this with the others, and with her answers to questions based on their contents, shows that she is able to recount still additional details. There is every reason to believe that these are veritable recollections, and that they are not confused with accounts of her childhood rehearsed to her later by parents and friends. She seems to have taken the greatest pleasure in recalling and reflecting upon her early life from the higher standpoint of her *articulate* consciousness, and in recording the events in her quaint and Latinistic style. She remembers that she "often subsisted upon many sorts of berries with most luxurious milk in the summer;" how she loved to "reach a great abundance of sour and sweet apples suspended on the branches of the trees;" how "I enjoyed myself exceedingly in observing her [my mother] spin, weave, and wind yarns, and doing other things exceedingly," and regretted that "I could not perform the latter, for it seemed prodigious;" how much "difficulty it yielded me to make myself understood;" how in a fit of passion "I rejected the poor cat vehemently into the

fire ;” “I was intimately acquainted with my grandfather, who was my male parent’s father.” She describes the capes, ruffles, and bindings of her dresses, and those of her friends ; tries to explain the process of making candles and soap ; remembers pounding up beetles and caterpillars in her mother’s mortar, how she used to dress up a boot as a doll, her adventures with domestic animals, her sports, occupations, punishments, medicines, and presents, the wrinkles on the hands and faces of her friends, the slender stock of signs by which she communicated with others, and how she strove, often vainly, to make her wants understood ; and pauses occasionally in the narration to wonder at and deplore with a sort of self-pity the ignorance of her early life, or to apologize for that of a quaint old bachelor-friend, who was very kind to her. Her psychological processes during these years, complex as they were, went on and were remembered entirely without the aid of language, which differs from other series of gestures only in being more explicit and capable of development, and in introducing into or imposing upon conscious thought a new logical order. Gesture in general may be described as a language of roots still more primeval than those which philologists seek to determine. Like articulate speech, it is a reflex of apperception, and is demonstrative or predicative, may be very express, or may be reduced to the slightest terms of motor innervation, and has its own distinct syntax, determined perhaps for the most part, as Geiger believed that of oral language to be, by the order in which phenomena affected and interested the sense of sight. Hence in these memoirs of her early life, Laura merely translates a less into a more perfect series of

re-actions and innervations — a process which probably does not differ so much from the case of a normal adult recalling and reflectively recording his earliest recollections, as language through the fingers and their cerebral centres differs from language through the vocal organs and the island of Reil. At least, it will be admitted that Laura's education at first revealed quite as much as it created intelligence; and we must wonder at her remarkable endowments, while we none the less admire the ingenious method by which she was saved from a life of isolation, which would otherwise almost certainly have ended in morbid irritability, melancholy, and finally in insanity or idiocy.

It has been often asked whether she is absolutely deaf or blind, and what is the present condition of her ears and eyes? The eminent Boston aurist, Dr. Clarence J. Blake, who kindly consented at the writer's request to examine her ears, reported as follows: "Both external ears normal. The right external auditory canal normal in size and contour, and the skin lining the passage healthy and showing no marks of previous inflammation-processes. The right membrana tympani was entirely destroyed, with the exception of a narrow rim, the remains of the inferior and posterior portions of the membrane, from which a thin cicatricial tissue extended inward to the promontorium over the stapes and fenestra rotunda. The malleus and incus had disappeared. The mucous membrane of the tympanic cavity presented a normal appearance, with the exception of one spot on the promontorium covered with a thin crust of dried secretion about two millimetres in diameter. A band of thin cicatricial tissue also extended across the anterior portion of the tympanic

cavity. The left external auditory canal was filled with dark brownish cerumen, on removal of which the passage was found to terminate at a depth of two centimetres in a diaphragm of secondary granulation-tissue completely closing the canal. This diaphragm was concave, very firm, and resisting gentle pressure with a probe, except at the central or thinner portions, where it could be slightly depressed. Its outer covering was continuous with the dermoid lining of the canal." The tests of her sensations of sound were made first with a tuning-fork with movable clamps, and set in vibration by a spring-hammer. The stem of the fork was placed between her teeth (false) and pressed against an ordinary telephone-disk, resting successively upon each mastoid process, over the forehead, at the junction of the frontal and sagittal sutures, over the vertex and the occiput. Heavier tuning-forks were afterwards used in the same way, and also in connection with a series of Helmholtz resonators, the points of which were introduced into the ear (for the use of which and other physiological apparatus the writer was indebted to the kindness of Professor H. P. Bowditch). The most piercing tones of König's rods, and the deafening noise produced by slipping the moistened fingers over the end of a toy telephone, one mouthpiece of which covered the external ear, were tried. A large paste-board trumpet, like those of a megaphone, though smaller, fitted to the osseous socket of the ear, such as has been so useful in some cases of deafness, was used; and finally electrical irritations were applied to the external ear, and sent through various parts of the brain. But all in vain. Once or twice her feeling was described as "like singing," or "as if some one was

speaking ;" but it was generally very certain that her only sensation was that of vibration or jar. Her sensitiveness for the latter is very acute. She commonly describes herself as hearing "through the feet." In this way she distinguishes not only the step, but sometimes even the voice, of her acquaintances.

From a rough preliminary experiment it would seem that she is able to distinguish a musical interval of somewhat less than an octave by the sense of touch through the end of the index-finger of the right hand, and yet this sense does not appear to recognize sonorous vibrations of less amplitude than normal persons can do in the same way; thus, although she lives in an absolute stillness, which, according to the speculations of Preyer, a hearing person can never even for an instant attain, she attaches a very definite meaning to the words "sound" and "hear." She also feels, of course, the vibrations in her own throat when she makes her "noises." With sensations which in this respect are perhaps scarcely above the average, she is able, without the distractions which continually enter through the normal ear and eye, to concentrate attention upon the meagre data until she has developed a set of perceptions and conceptions so little incommensurate with the ordinary auditory consciousness that they do duty for it to a surprising though still slight extent. Of the physiological basis of this sense of vibration or jarring, almost nothing is as yet known. It appears to have some of the characteristics of a distinct and specific and some of a generic sense. Investigations already begun in one of the German laboratories may increase our knowledge of its nature. If oscillations as such can be directly felt, then the most generic fact

of the physical world enters consciousness immediately without passing any "inconceivable chasm."

Dr. O. F. Wadsworth, an accomplished oculist of Boston, who kindly consented to examine her eyes, reports as follows: "On both sides the lids are sunken, partly on account of lack of the normal amount of orbital fatty tissue. Partly on account of the small size of the eyeballs, they remain constantly closed. The right conjunctival sac is much smaller than normal, somewhat irregular, and presents an appearance such as is seen after severe and long-continued inflammation. The right eye appears about one-half the normal size. It is wholly enclosed by the sclerotica, except over a space at the centre some two millimetres in diameter, where a less opaque tissue on which a few blood-vessels are visible represents the altered remnant of the cornea. The left conjunctival sac is somewhat larger than the right, and more regular, though still small. The left globe also is a little larger than the right, and its opaque altered cornea is some four millimetres in horizontal and two millimetres in vertical diameter. There was constant irregular oscillation of the globes (nystagmus) whenever they were exposed to view by raising the lids, and the oscillation evidently continued even after the lids were closed." Possibly this was due in part to the excitement of the visit. The sensitiveness of the eyes was still further tested by a ray of sunlight directed to each ball (after the lids had been raised) from a heliostat, and gradually concentrated until the point of almost painful heat was reached; but with no trace of any but a slight "stinging" sensation in the left ball. Gentle pressure and electrical irritation applied both to the

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orbits and directed through the visual centres produced no effect whatever. During her childhood at home she was just able to distinguish lights and windows in a room, and (her mother thinks) to recognize people dressed in white, but these sensations were so feeble that she seems almost never to have utilized them in directing her motions; and even these seem to have been lost soon after she went to the asylum. She has always, however, especially in bright sunlight, complained of a slight "pricking like needles" in the left eye. Partly for this reason, but chiefly to cover the shrunken globes, she wore constantly for many years a band of heavy green silk bound over both eyes. It is thus manifestly impossible that any, unless it be the most rudimentary, visual impressions can have directly entered as factors into her intellectual development. Hence her notion of color is even more purely conventional than that of sound. She remembers having learned that mosquitoes, the wind, certain animals, and impacts make a noise, but did not know, or had forgotten, that flies, running water, rubbing the hands, etc., did, and was uncertain about many other things. So she remembers the names of the colors of her dresses, flowers, sky, grass, blood, and often insists that certain garments are too light for winter or too brightly colored for one of her age. All this, however, is merely conventional and verbal. She has never formed any mental conception of what color is or is like, as do so many of the blind. It was never in her mind identified with or even analogous to any notion or sensation of sound, smell, taste, or touch, as with so many who have only some or all of their senses.

The fundamental notion of space is probably not different in the blind and the seeing, although it is concretely filled out in a different way. This is, at any rate, the opinion of Helmholtz. But our whole spacial consciousness becomes different the moment we even close the eyes, and our movements change their character, as experiments on hypnotized patients have shown. Whether from Laura's conceptions of space-relations, the influence of previous visual impressions has been entirely lost, is one of the most difficult and important questions. She is far less "blind-minded" than many of the congenitally blind, yet she forms conceptions of aggregates with difficulty. She knows that her room is square, but is not certain that the house is so. She can form a very poor image of how the grounds with which she is perfectly familiar would look from a house-top, has a very poor notion of perspective, knows very little why or how much objects look smaller at a distance, and is unable to tell without much reflection how many sides of a hexagonal column can be seen from one point of view, though she has learned well that rays of light move in straight lines. In spite of her wonderful powers of recalling past sensations, even those of her childhood, she remembers nothing of seeing; though it is quite impossible to believe that the very many and complex motor reactions and co-ordinations which a bright child learns by means of this sense before the age of two years can have been entirely lost. These, and not the small though essential factors of sensation, constitute education in its enduring results. She turns the head but very slightly in the direction in which her attention is excited, but invariably extends one hand. The irreg-

ular motions of the remnant of her eyeballs have also no psychical significance. But the occult effects of the early possession of vision are to be found, if at all, in her wonderful memory for forms, and in her perpetual craving for a fuller and larger knowledge than it is possible to convey to her, which rises at times almost to question-mania [*Grübelnsucht*]. Even on the basis of the Berkeleyan theory, it would be expected that a knowledge of the external world derived through touch and muscle-sense alone would be more *serial* than where the broader and more rapid perceptive processes developed through the visual centres come in, to review, epitomize, and extend impressions from without. The question also arises, whether a person with for years only a very vague sense of intense light, and using this to anticipate tactile impressions, e.g., to avoid the fire and go towards the window, etc., would not get through the eye a better because far more serviceable idea of the third dimension of space than of the other two. After the retina is destroyed, whether by disease or by artificial lesion, the eyeballs gradually lose the power of moving together, but move disparately, like those of a very young child, a drunken person, or as in sleep. Laura's rudimentary eyeballs have so little motion, that it is hard to determine certainly whether they move together or not, especially as their movements cannot be controlled. They seemed to me to do so, though not perfectly. Winking, too, is a reflex act, depending for its frequency partly on the dryness of the air and the rapidity with which the moisture dries off from the cornea to the point of effective stimulation, and partly upon the excitability of the brain, attention, etc. Laura's lids, though very nearly closed, wink

distinctly when she is not sleeping : so far as observed, however, attention directed to the eyes did *not* accelerate the winks, as it does in normal persons.

The inflammation of the olfactory mucous membrane during her long illness was severe ; and the sense of smell was almost entirely lost, though it has slightly improved with advancing years. She has never had the habit, which so many blind persons acquire, of testing objects by applying them to the nostrils. There is, however, no deformity or scarification observable without or from a cursory examination within the nose, and the yellow pigment of the schneiderian membrane can be faintly seen by a simple apparatus. According to the very questionable hypothesis of Dr. W. Ogle, this sense might from the first have been rudimentary in a person of her complexion. Her mother, however, does not remember to have noticed during her infancy either the presence or absence of this sense, although the latter would probably have been more conspicuous. At present she loves to smell flowers, and can distinguish a few of the more fragrant varieties. Eau-de-cologne, ammonia, onions, tobacco-smoke, were recognized and distinguished only when quite strong ; and the same was true of aromatic flavors. In losing the sense of smell, in some respects the most delicate and the most wonderful (perhaps because the least known) of all the senses, she is deprived of a means of communication with the objective world of the greatest importance to one in her condition. Julia Brace and other blind deaf-mutes have been able to sort the freshly washed clothes of the inmates of a large asylum, and to select and give to their owners several dozen pairs of gloves thrown promiscuously upon a table, solely or

mainly by the sense of smell. A hasty experiment with Laura to determine whether smell was more acute in inhalation or exhalation was without result. The sense in both nostrils is about equally intense ; and once when eau-de-cologne was applied to one nostril, and tobacco to the other, she recognized both. Whether this was done more or less readily than would have been the case if the odor of both had been inhaled with equal strength by both nostrils at the same time, seems by no means certain.

Taste is not so much a single sense as a plexus of senses. To sensations of cool, biting, and astringent substances, pepper, alum, etc., located in the gums as well as in other parts of the mouth, she is very sensitive ; to flavors perceived in the nasal cavity, far less so ; and of the four tastes proper she seems least sensitive to bitter and sour, most so to sweet and salt ; while the observation that the base of the tongue is most sensitive to the first of these tastes, the sides to the second, and the point to the third and fourth, appears to have partial verification in her case. She also experiences the peculiar taste caused by electrical stimulation : she is, however, very far from being indifferent to the kind and quality of her food, but satisfies the very moderate demands of her appetite with a deliberate and almost epicurean discrimination, which suggests the existence of what Professor Bain describes as sense of relish, quite apart from taste proper, and felt perhaps most keenly just as food is leaving or just after it has left the region of the voluntary and entered that of the involuntary muscles of deglutition. The circumvallate papillæ have about the same superficial appearance as on an ordinary tongue, perhaps smaller

but scarcely less numerous. Both this sense and smell have a strange intermittency, which resembles that of the higher senses and of the intelligence itself in many forms of nervous and mental disease. In making the above observations, both, especially taste, after being considerably acute for several minutes, often seemed suddenly and unaccountably to vanish, and no trace of sensation could be observed under very strong stimulus. It would be very interesting to know what sort of a curve of fatigue, if any, such modifications of sensibility follow. It may be analogous to the speedy rigidity of the hand in contact with the cathode when a strong galvanic current is sent through both arms, in Ritter's well-known experiment which Pflüger has so ingeniously explained.

u. From the above we feel justified in inferring, that the lesions of each of the four defective senses were primarily peripheral and so complete that none but taste has essentially contributed in developing her consciousness of the external world ; while the functions of the centres, already somewhat unfolded though so slightly localized as they are in children of two years, adapted themselves with less than usual loss of power to their new and unfavorable conditions. The time for such a fourfold affliction was perhaps the most favorable possible. Had it fallen earlier, the physiological development of the centres might have been still more dwarfed, and the impulse toward mental growth still feebler ; had it come later, together with a possible diminution of vicarious and adaptive power, the memory of loss would have perpetually saddened her now exceptionally happy and buoyant spirits, and she would never have been able to forget, as she seems

completely to have done, that what others know as a manifold objective world she is doomed to perceive only as a play of shadows across the narrow field of a single sense. The time of her discovery by Dr. Howe, and the beginning of her education at the age of eight, seem also very opportune. She had had time to recover from her long illness, and to learn much about things concerning which she had already begun to feel a strong and ungratified curiosity.

Her desire at one time to have a mirror in her room, the pleasure she experiences in feeling a little music-box as it plays in her hand, her love of having perfumes and of eating things like certain jellies, farina, etc., which can have have little or no taste to her, have been called affectations, but are inevitable results of association with normal people. An *esprit de corps* is as unfortunate among defectives as among prisoners. Among the blind and deaf Laura has had comparatively few acquaintanceships, considering that so much of her life has been passed at an asylum. Only the case of the mirror can be called pure affectation, while even her "taste" of jellies seems largely due to the purely æsthetic feelings of touch in the mouth. Wundt's ingenious theory of facial expression, viz., that it originates in movements calculated to modify vision, smelling, taste, and in part hearing, is not favored by observations on Laura. True, she does not open the mouth in the ordinary way to indicate great attention or surprise, and the upper part of the face and forehead, as compared with that of most of the blind, is quite immobile; but she can hardly have learned to draw the lips and cheeks toward either side away from the gustatory surface of the edges of the tongue because sour is

tasted there. Nor can the mimesis of her nostrils be explained without making large drafts upon the principle of heredity. All the lower part of her face is extremely mobile and expressive, as with most of the blind, in spite of constant effort on the part of her teachers to check unpleasant excesses. Lack of sympathy, and cruelty, have been observed as frequent characteristics of the deaf, and are no doubt due largely to the fact that human sentiments and all the finer feelings and emotions are mainly conveyed through the voice. No one, however, can doubt, despite the several instances of cruelty recorded of her childhood, that Laura's nature is unusually sympathetic. She often fails to understand readily the feelings of others; but, when they are made clear, the response is far too quick and hearty to be for a moment considered as merely conventional. As a rule, too, people of defective hearing have a narrower range of emotional life. Laura is probably no exception to this rule. Her feelings and emotions are intense, but few in kind.

Local discriminations through the skin are developed with remarkable and in some respects unprecedented acuteness. Discrimination of peripheral sensibility in a normal person ranges from about 68 millimetres between the shoulders, to .0005 millimetres on the *fovea centralis* of the eye. (If we mentally construe all these forms and degrees of sense into terms of touch, as they may perhaps primitively have been, we shall be able to conceive how great is Laura's disadvantage in communicating with the external world.) Now, it is well understood that of Fechner's methods of measuring sensibility, that of the *average error* gives the lower, and that of the *just observable difference*

gives the upper threshold-value, while that of the *right and wrong cases* gives results which fall near the middle of the thus quite extended threshold. In choosing the second of these methods, it is desirable that the series of measurements be a descending one: i.e., the points of the pair of compasses must be gradually approximated till the sensation of two points gives place to that of one. In this way the threshold-value is less than if the series be reversed. Proceeding thus, it was found that Laura was able to distinguish two points at a distance of 0.502 millimetres on the point of the tongue—an average of twenty-four observations; at a distance of 0.708 millimetres on the volar side of the end of the right forefinger—an average of thirty-seven observations; at a distance of 1.2 millimetres on the inside of the red edge of the lips—an average of eight observations; at a distance of 1.6 millimetres on the outside of the lips—same number of observations; at a distance of 1.51 millimetres on the end of the second finger—eight observations; 1.8 millimetres at the end of the third finger—eight observations; 1.9 millimetres at the end of the fourth finger. On the upper lip, just above the end of the mouth, she distinguishes an interval of 3.5 millimetres; at the back of the tongue 4 millimetres; on the forehead between the eyebrows transversely 6.71 millimetres; on the tip of the nose 1.7 millimetres; on the point of the cheek-bone 3.04 millimetres; each of the last five measurements being averages of twelve observations made on three different days.

By comparing these results with Weber's tables, it will be seen that tactile sensibility in most of the places measured is from two to three times as great as that

of an ordinary person. In making the above observations, however, it must be noted that a strange variation of sensibility was observed, which was so great as to make the preliminary results here given reliable only in proportion to the number of single measurements from which they were averaged. Sometimes with the utmost apparent straining of attention, the discriminations were less than half as acute as at others. So great is this variability, that it is hoped that a curve of fatigue may be obtained by which some approximate comparison with the fatigue-curve of a nerve-muscle preparation may be made. We may already infer, however, that the exceptional acuteness of this sense, in Laura, is centrally and not peripherally conditioned. It is probably due to the unusual energy with which she has learned to concentrate attention upon the sensations of fingers, tongue, etc. It was often observed that the *Empfindungs-Kreise* were ellipsoidal and not round, the longer axes coinciding with that of the body or limb;¹ and that, when one point of the compasses was rotated about the other, at a distance of only one-sixth that of a diameter of the *Empfindungs-Kreis* within which they were placed, the sensation of motion was distinctly felt. The habitual exploring touch-motions (*prüfende Tastbewegungen*) which, as with most of the blind, are almost irrepressible with her

¹ Czermak's explanation of this general fact, viz., that these sensory domains are round in children and become oval because growth is proportionately greater in length than in circumference, seems partial. Most of our motions, both of the body and limbs, are in a horizontal plane; i.e., at right angles to the long axis of these domains: hence that direction grows more sensitive. Moreover, as Horwicz well remarks in commenting on the proven inaccuracy of Vierordt's law, frequency of use is a co-factor with mobility and original nervous structure in determining the sensitiveness of different parts of the body.

during such experiments, has perhaps made her more sensitive also in this respect than others, although this point has never been investigated. It was very evident before the writer's observations were interrupted, that there were strange and sometimes abrupt variations from the tactile sensibility of a normal person in certain accessible parts of the skin which were neither scarred, nor ever in any way, so far as could be learned, injured or diseased. These spots are so obtuse in the discrimination of local signs and local color as to suggest the question whether certain slight twitches often observed in various muscular groups, which according to the radical nomenclature of Hughlings Jackson must be called epileptical, together with certain other almost equally mild hysterical symptoms, may not have had the result which is so common in severe forms of these disorders, viz., partial and more or less distinctly defined dermal anæsthesia. Laura has in the hands and face a sensitiveness to ordinarily imperceptible and sometimes imaginary dust, which very closely resembles, save in degree, that described by Charcot and Westphal as one of the characteristic symptoms of incipient mania. Her touch is thus so acute, that it is not surprising that she estimates the age of her visitors by feeling the wrinkles about the eyes, and tells the frame of mind of her friends by touching their faces, nearly as accurately as a seeing person could do. From the tonicity of the muscles or the movements of the hand she conjectures the grade of intelligence of her visitors, and long ago learned to detect almost instantly the hand of an idiot by its peculiar flabbiness. She tells readily the time of day by feeling her watch, remembers the hands of her friends for years. A few of the

figures of Zoellner and Hering were found to be as deceptive to the touch of the blind when pricked on paper as to vision. It has been said, on the authority of Professor Abbott in "Sight and Touch," that if a flat surface be pressed with the fingers first gently, then hard, then gently, and again hard, gently, hard, it will seem in the one case convex and in the other concave: this after many attempts the writer was unable to verify with Laura or in a single case with a score or two of the blind.

Her sensitiveness to heat is below the average. She certainly could never distinguish colors by difference in their powers of radiating heat. It has been observed, that when seeing people are blindfolded they are able to tell which of five or six familiar and previously-named objects is held before the face at a distance of from one to three or four feet. A book, a folded handkerchief, a scrap of sheet-iron, and a piece of gauze, e.g., all of about the same surface-measurement, are distinguished in this way, as well as the side of the face towards which they are held, by a friend of the writer, almost invariably, at a distance of four feet in a darkened room, and with every precaution to avoid giving any clue to the eye or *ear*. Is this due to the modification of half-imperceptible sound-waves affecting the tympanum, or to the changes of thermal radiation from the skin, or to modification of atmospheric pressure? Laura has very little of this power, but observations on the deaf have shown that some of them possess it to a great degree. Moreover, it should not be forgotten that the ear is a bad judge of direction: hence we must assume that other elements enter in as the data of sensuous judgment in this phenomenon. Only a cur-

sory examination of the dermal sensibility to temperature, pressure, and electrical stimulation, was made; but this indicated in each of these respects, and especially the last, a degree of sensibility below rather than above the normal. Finally, it may be mentioned, that, from a short series of measurements which a lady-attendant kindly consented to take upon parts of the body usually covered by clothing, it would seem that here the discriminating sensibility, though decidedly above the average, is much less so than in the more sensitive parts of the hands and face. In applying the compasses to one arm a concomitant increase of sensitiveness was observed on the corresponding part of the other.

To test the sense of equilibrium, an ordinary swing with a long board, pillowed, and provided with a foot-piece, was used, on which she consented to be rotated, lying upon her back, her face, and both sides. In each of these positions, after being turned through a hundred and eighty degrees and then gently placed upon her feet, there was a very evident disturbance of muscular co-ordination, and she insisted that she was very dizzy. On rotating her through two hundred and seventy degrees she was hardly able to stand without support, and complained of nausea, describing herself very vividly by gestures and language as seeming to "turn over" in the same plane in which she had been rotated, but in an opposite direction. Of the genuineness of these sensations, her ignorance of the object of the experiments and of the normal muscular movements of compensation leaves no reasonable doubt. The dizziness, it was further observed, must be considerable before the power of correct orientation was lost. She

was able to tell more correctly than several normal persons who afterwards tried the experiment upon themselves blindfolded, whether she had been turned through half or three-quarters of a circle. She was equally sensitive to rotation in a horizontal plane. By so *ex tempore* a method it is of course impossible to exclude, as Mach has at least partially done, the influence of tactile sensations caused by friction, and the process of standing her suddenly upon her feet after every rotation complicates the disturbance; but it is impossible to doubt that she is so extremely sensitive to disturbance of equilibrium, in which both the deaf and the blind are often deficient, as to compel the belief that, upon the hypothesis of Goltz and Mach, her labyrinthine impressions are at least normally acute, and to make a *post mortem* examination of the semi-circular canals with their nerve and its putative centres extremely desirable. She does not appear to be in the least ataxic; but it will be remarkable if touch and muscle-sense have, in addition to all their other vicarious functions, so well learned to discharge those now generally supposed to be due to endolymphic pressure. She can walk alone very nearly in a straight line, and without deviating more often to one side than the other, though always with a hesitating but not unsteady step. She takes long daily walks with her attendant, looks after her own room, goes freely all over a large house, and in any place with which she is familiar knows the points of the compass. The ear is eminently the time-sense as the eye is the space-sense. It distinguishes far finer intervals than the eye, and gives us about all our knowledge of rhythm. Laura cannot even beat time with any thing like regularity, although she walks with

tolerably regular steps. Her original "poems" have not only no rhyme, but no rhythm, which, knowing so imperfectly as she must the distinction between vowels and consonants, and the syllabic nature of words, is not surprising.

The more strictly organic sensations are not accessible to exact measurement. Even the muscle-sense, or feeling of innervation, which even in the case of a normal person, and still more in her, is so largely instrumental in the work of objective perception, and which seems to be so exquisitely delicate in her hands, cannot be directly tested. When told to extend the forefinger, and move it as slightly as possible, she makes motions which the eye can but just detect. When the arm or hand is taken and moved through a fixed distance, as an inch or a foot, and she is requested to measure off the distance on a smooth glass rod, she does so with considerable accuracy; although this, like all her similarly-indicated estimates of distance, is slightly less than fact. When the compasses are applied to hand, arm, or shoulder-blade, with their points separated in each case about three times the least discernible distance, and she tries to reproduce these intervals in terms of muscle-sense by measurement on the glass rod, it is found that she invariably judges the greater distances to be proportionally less than the smaller. We can by no means infer from this that her notion of the form of her own body is different from the reality on account of the variable discriminative sensibility of the skin. There are very many ways in which this tendency would be corrected in the blind. Yet when asked to make a series of straight marks, e.g., two inches long and two inches apart, the first

pair with the hand in the ordinary manner of writing, the next in a constrained position, writing on paste-board pressed against her back, and so on alternately, the marks made in the latter position were found, in an average of over thirty cases, slightly shorter and slightly nearer together. It would be very interesting to compare these results with those obtained with a large number of normal persons. Like many women of somewhat delicate health, she appears very susceptible to other organic sensations; and, though subtle inferences might be drawn about semi- or sub-conscious states and processes from her moods, which vary considerably, she seems never to have developed, as a late writer asserts is almost inevitable among those whose sphere of objective mental life is abnormally circumscribed, any "liver-consciousness" or "heart-consciousness" or "stomach-consciousness." She has never, so far as is known, shown any special trace of hypochondria or hysteria, or even melancholia; and in every thing sexual her education has been so discreet that the innocence and purity of her thought and life are said by those who know her best to be absolute and even unique. One of the most common notions developed among the blind when they are left much to associate with each other is that they have one real advantage over the seeing in that they are free from all species of optical illusion; and thus, although they know less, their knowledge is more untheoretical and realistic. In this way Laura's is in a double sense realistic and objective. All her knowledge is literally *handgreiflich*. Touch seldom deceives or misinforms, and its *rapport* with things is most immediate: hence she clings to all its impressions, even when told they are wrong, with great pertinacity.

The physiological theory of language regards it as originally an immediate motor reflex of sensations perhaps mainly visual, and as being thus a more or less complex series of gestures which soon come to acquire a special auditory significance as a condition of a remarkable subsequent development. Regarding words as gestures, it would once have been comparatively easy to teach Laura by such manipulation of the organs of speech as Graham Bell has applied in teaching the deaf to talk. By this method, with the use of a manipulator, the writer taught her in half an hour to articulate the words "good day" intelligibly; but the next day they were quite forgotten. She is now too old, and too adept with the finger-language, to make a new method of speech possible. She learned long ago, by feeling the throat and mouth of others, and by their help, to pronounce three or four words quite well, and has never forgotten how to say "doctor," "Peter," "money." She has also half a score of "noises" designating persons. These seem to be produced by translating the complex of impressions, or more strictly sensations, which others excite in her, into the movement-feeling of "throat-gestures;" and thus they are very analogous to cases of so-called "indirect onomatopoeies." Still more interesting, however, are the instructive and utterly unconscious sounds, which Dr. Lieber took so much pains to investigate, that do not designate objects, but express her own feelings. These, to the number of nearly thirty, the writer attempted, with the kind assistance of Miss Fuller, principal of the Horace Mann School of Deaf-Mutes in Boston, to record by the Bell method of visible speech. They are always accompanied with marked facial and often

manual gestures. She thus often expresses feelings which she wishes to conceal, as well as shades of feeling too slight and subtle for the fingers. On being questioned, she insisted that she could "*think*" three noises — even a very loud and disagreeable howl of anger which she has been heard to utter but two or three times in her life — without making them, but she could not make them without the feeling. By special request she tried several times with great complacency to make the "angry noise," but in vain. She once said, "When I think of Julia I think her noise, and do not think to spell her name." Several of the emotional sounds were made during a dream, the pantomime of which was very expressive as she took her after-dinner nap upon the sofa. She is very positive that her nightly devotions are without vocal or manual signs. These devotions are very regularly performed, and the signs, so far as could be learned, have never been observed. These interjectional sounds, which her teachers have often striven, but only with partial success, to repress, are not loud or disagreeable, are readily intelligible, and, so far as the data for comparison exists, seem neither to have essentially changed in character or in pantomimic accompaniment, nor to have increased in number, for many years. She feels that it is "not ladylike" to make them, and is glad to be corrected; but unless they are quite loud, cannot tell, even if her attention is directed to the matter, whether she really makes a noise, without placing her hand upon her throat. Pressing thus upon the throat of several persons successively, she sometimes sportively attempts to imitate their voice with her own in a way which shows that she does distinguish differences of both

loudness and pitch (paradoxical as the language may be) without any conception or sensation whatever of sound. That her emotional "noises" have any such philological importance as roots, as Dr. Lieber and others have imagined, seems on the whole very doubtful. Aphasic patients sometimes use a set of new and strange sounds as designations of objects or as expressions of passion consistently and without change for years. True, her sounds have not been modified, as are the natural cries of those congenitally deaf but not blind, by imitating the motions of lips and tongue which they see others use; but the fact that she has once spoken is very vitiating for such a view. Could, however, any inference whatever bearing upon this, perhaps the most important and most difficult of all psychological questions, be drawn from such facts as the above, it would be that language originated, not in the imitation of natural sound, nor in the impulse to communicate with others, but as a purely physiological reflex excited by the stimulus of outward impressions acting upon or through the senses.

She is not apt, like many defectives, to fall asleep if left alone or unemployed. Her sleep is perhaps lighter and shorter than the average. Several midday naps were observed. She first groped about the room to assure herself that she was alone, then lay down, her face upward and the right or talking hand folded in the other upon her breast. There was at first a slight and regular movement of the chin and toes, while the faint prolonged sound of "oo" (as in "fool") often accompanied expiration; slight epileptic twitches several times roused her to quite a pantomime of rapid, troubled, and mostly unintelligible gestures; till at

length she fell asleep with long, regular breathing, the teeth slightly apart, and the tongue pressed against and almost between them. Just before sleeping, a strong odor of eau-de-cologne and a drop of sugar solution, which she readily perceives when awake, applied respectively to nose and tongue, caused no apparent sensation, while the slight touch of a fine thread upon her face or hand roused her at once. It is possible she directs her attention to the cutaneous sense of these parts, as we often "set the mind" to wake at a certain strike of the clock; or perhaps this sense is the last to fall asleep. Her sleep seemed almost never untroubled by dreams. Often she would suddenly talk a few words or letters with her fingers, too rapidly to be intelligible, just as others often utter incoherent words or inarticulate sounds. Movements of the lips were also observed, and the emotional expression of her face was constantly varied. She asserts that she dreams much, but finds it very hard to recall her dreams; insists that she has dreamed of hearing with her ears the angels playing in heaven, of seeing the sun so bright that her eyes ached, and of standing in a large place surrounded by many people and seeing God afar off. In relating these dreams her manner is very earnest and intense; but if questioned how the music sounded, how the objects looked, she could give you no more detailed answer than "glorious," "beautiful," etc., and often became quite impatient at the scepticism implied in questioning her closely. She has many times dreamed of being awakened suddenly by animals touching her, or jumping upon her bed. If a normal person dreams in terms of touch, this sense is generally excited only at the end of a series. The

dream begins in terms of sight or hearing, and rarely goes so far as contact. The suddenness of so many of Laura's dreams, which begin and end in the domain of touch, thus indicates that her dreams are only in its language.

Most dreams are reflex phenomena due to the irritation of sensory nerves. Any or all of the five senses may be excited during the soundest sleep. If attention is directed to the darkest field of vision, we can always see the light-chaos or dust (*Eigenlicht*), or perceive a difference of intensity between the centre and periphery of the field. It would almost seem that modifications of retinal circulation, nutrition, temperature, etc., have a psychical side accessible to self-observation. Goethe could always see streaks of mist; Purkinje saw broad, bending bands, sometimes moving in concentric circles or breaking up into arcs and radii. To J. Müller, these moving spots of mist seemed colored, they moved about from side to side of the field of vision, gradually took shapes quite disconnected from any objects of recent experience, and finally passed into dream-images. Thus, from the nature of the light-chaos, we may account for the reduplication of dream-objects, — swarms of birds, flies, stars, kaleidoscopic patterns, etc. H. Meyer and Patterson, on waking suddenly, have seen the after-images of dream-objects slowly fade through complementary colors. We may infer from such facts how strongly the higher centres sometimes re-act in dreams upon relatively slight stimuli of the lower. Hermann further concluded that those who were blinded by lesions of the peripheral organ gradually lost all distinct visual conception, first from the waking and later from the sleeping con-

sciousness. Laura never has been, and can probably never be, taught to observe and note down her dreams with any such precautions as Wundt suggests; but a careful analysis of all dreams which she now remembers, or which others have recorded, yields no good ground for believing that she has ever had any kind of visual or auditory conceptions even while sleeping, when the immediate sensation is a still more minute, though perhaps no less indispensable, element of perception than in the waking state. Even her sexual dreams, there is every reason to believe after the most careful inquiry, have always been very few in number, and of so naïve and unspecific a character that only a psychologist would designate them by that name. Now that she has safely passed the most trying period of womanhood without more instruction on such subjects than was strictly necessary for her health, it seems on the whole not improbable that the strongest of all instincts has in her failed to mature, either in the waking or sleeping consciousness, into any distinct *à priori* notion of the ways and means of its own gratification. This is in accordance with observations made on birds, and even rabbits, in which the sexual instinct is destroyed or weakened if the eyes are destroyed, or does not develop if they are extirpated very soon after birth.

Schnerer has propounded the curious and improbable theory that dreams are symbolic of the constitution and functions of different parts of the body. All dreams, he asserts, are reflexes of organic feelings, and their types and genera are determined by the forms and positions of the organs. The intestines, e.g., appear in dreams, "after the ego-power is scattered

and dispersed," as streets and canals; the stomach, as an enclosed or sequestered village, or as a dark room with one or two round windows. The body as a whole is always a building of some sort. He dreamed of two rows of boys in red and white, rushing to fight each other, retreating and fighting again round after round. These are explained as the teeth, the involuntary grinding of which is supposed to have caused the dream. The lungs are objectified as a pair of regularly-beating wings in dreams of flying, the heart is a fiery furnace, a stove, the sun, etc. Even colors, as of the hair, the blood and bile, are reproduced. Not one of Laura's dreams can be satisfactorily interpreted by any of these rubrics. This test of Scherner's theory is of course not crucial; but if internal organs are ever represented in the consciousness of sleep, and especially if they are archetypal there, we should expect this to be peculiarly so in Laura's case: so that to all the psychological objections to such a theory her dreams add, in some degree, the force of an experimental refutation.

Wundt holds that all dreams, hallucinations, nocturnal insanities, etc., are automatic excitations of what he assumes as a *sense-surface* in the cortex caused by modifications of its circulation, and that they are thus reflexes, originating in the innervation-centre of the blood-vessels in the medulla. This may be true of many toxics and soporifics, and disorders of the blood-vessels and heart very often accompany or precede mental disease. It is an assured law of psychiatry, that every functional or mental disturbance brings about anatomical changes in the brain; and thus dreams may even permanently affect the sanity of

waking-hours. Hence, if we admit, upon the uncertain hypothesis of Hughlings Jackson, that the development or nutrition of cortical cells is determined and limited by the course of blood-vessels in the cortex, we should expect that the cells lying nearest them, and which we may fancy to represent the earlier acquisitions, are more immediately affected than those distant three or four removes and representing later acquirements and experiences. If this were true, we ought, according to Wundt, to dream mainly of the experience of childhood, and not of the preceding day; and it would be at least possible that forgotten events of early infancy should be reproduced. Dreaming and waking notions are related as species and genera, or as a more partial to a more perfect function. Attention, to the physiologist, is essentially the expression of an instinct. The mind pushes on from one impression to another by a native spontaneous impulse of growth and development. If we may conceive every thing psychical expressed in terms of inner tension, we may say that the direction and movement of attention is like the successive waking of the different elements of psychical life. In the sleeping consciousness, this process is mainly an automatic and central one. "Inner work" has brought cells into unstable equilibrium, and excitability very easily becomes excitation. Where the work of repair is not done, the slight stimuli of the sleeping state is not sufficient to rouse them: where it is done, the almost spontaneous activity of rested cells easily raises their processes above the threshold of consciousness. These are of course fresh and healthy morning dreams; while only those cells which had suffered the greatest fatigue, or which, long

after the outer senses slept, had been morbidly prevented from restfully sinking below the threshold to the inner work of repair by the persistence of mental after-images of recent events, may be said still to wake. Now, in the waking state the activity of the senses brings to bear an environment with which the normal action of the centres, if acting only by their own law of rest and fatigue, is more or less inconsonant. Not only can attention not always be accommodated to its object beforehand, but certain centres are disproportionately exercised. In sleep all the centres have a greater degree of physiological freedom. Possibly Laura vaguely strove to express this distinction in a line of one of her so-called "poems," viz.: "A good sleep is a white curtain, a bad sleep is a black curtain." All the intellectual work she has ever known has been scarcely more than the exercise of what Mr. Spencer calls the *play-instinct*. What she has done has been spontaneous. The sudden arrest of peripheral activities of the higher senses, leaving their centres under conditions which perhaps kept them exceptionally unatrophied, may have raised the level of cell-equilibrium, so that she both wakes and sleeps on a higher plane of cerebral rest and nutrition. This, at any rate, is not inaccordant with the remark of the physiologist Burdach, who, in comparing the accounts of ten blind and deaf mutes, argued that Laura's remarkable understanding was due to "the creative elaboration of impressions unprecedentedly limited in variety." Indeed, Laura is not unlike one sitting forever in the mouth of a cave, gazing at the play of shadows cast from objects without, which they never see, by light entering from behind. All the objects

which we see and hear are to her but shadows flitting across the single sense of touch ; or, again, as if objects of three were represented in a space of two dimensions.

To distinguish what was native from what was adventitious in Laura's moral, and especially in her religious, development, was one of Dr. Howe's chief interests. He had no Rousseau-like expectation that perfect goodness would result from her unprecedented isolation ; still less had he any wish, as was sometimes fanatically urged against his method, to retard the unfolding of her mind in either of those directions. He only required her teachers to refer Laura to him for answers to her occasional questions upon these subjects, and sought in every way to shield her from dogmatic indoctrination. The early record of her fresh and original intuitions, of her curious approaches to questions regarding the nature and necessity of a First Cause, of the unaccountable development of her conscience, — all so essentially correct, yet so unconventional, — excited great interest at a time and among people where the central question of theology and philosophy was, to determine what factors of consciousness were due to experience, and what were *à priori* or intuitive. About 1845, soon after his return from some months' sojourn in Europe, Dr. Howe was quite disheartened to find the mind which he had labored so long and devotedly to develop in the way which he believed to be at the same time best for it and most instructive to the world, conventionalized by the doctrines and sentiments of one of our popular orthodoxies. "I hardly recognized," he said, "the Laura I had known." We should not be greatly surprised

if his interest in her became gradually less as she fell more under the influence of her new spiritual guides, and thus grew month by month less original and less interesting. Nothing can exceed the crudeness of the Bible translated into terms of her one sense of touch.

"Is not the Lamb of God grown to a sheep yet?"

"Will Jesus carry us in his arms so?" (with the gesture of a mother embracing her child.) "Was not Thomas right wanting to feel the wounds of the spear?" These and many other similar questions are on record, attesting at the same time her native curiosity and the poverty of her conceptions. It would seem, as far as can be learned, that since the time of her conversion, and admission with immersion into the Baptist Church, her disposition has grown sweeter and her temper more uniform. But when one takes the trouble to enumerate the facts of the New Testament and the cardinal Christian doctrines with their standard forms of illustration, of which she can have even no childish conception, it is seen how minimal the intellectual element of faith may be; while if, on the other hand, with Schleiermacher, we consider the essence of Christianity to be the formulation of the instinct of dependence, so unprecedentedly strong both by nature and education in her, we shall possibly wonder less that so many of her friends have found edification in her numerous conversations and letters concerning her religious experience and belief.

The above is very far from exhausting, even in epitome, the interesting points suggested by the study of this remarkable case. Laura has very little idea of the interest she has excited in the world; is intensely delighted to see her friends, or to receive any little

attention or remembrance from them ; and is so good-hearted that the writer is pleased to state in closing, that, in spite of the weeks of annoyance to which his experiments subjected her, she was always cheerfully ready at the appointed time, and still cherishes only the kindest sentiments towards her tormentor.¹

¹ A question of great interest, suggested by the editor of *Mind*, with reference to a note of Whateley's *Logic*, is, how far has Laura been able, with the help of her means of expression, to form concepts proper, and how far her thinking is able to proceed without the help of her manual marks and signs. Whateley's statement (foot-note to Introduction, § 5) that slight and unintelligible motion of the fingers can generally be observed when she is musing by herself, is not in accordance with the writer's observation. She often sits alone, apparently absorbed in thought, and reflecting her emotions in smiles, frowns, etc., and with no movement whatever of the hand, although the latter is sometimes observed. If we consider that all impressions above those of touch, which others apprehend in the form of sensuous images, must be thought by her, if at all, as general conceptions, it seems probable that her thinking does range beyond the individual objects of *her* sense without finding signs necessary as instruments of thought. This conjecture is strengthened by the general intelligence which appears to have characterized her childhood before her education began.

THE PERCEPTION OF COLOR.

THE finest distinctions which the ear can make—whether in detecting differences as small as one sixty-fourth of a whole note, or between harmonic upper partial tones—are at first purely mechanical processes of the terminal apparatus of the auditory nerve. Only after this process is complete, does the neural process of the extremely specialized fibres, which ends in the sensation of tone, begin. The physicist can follow the sound-waves as they are conducted through the outer media of the ear, as their amplitude is diminished and their force increased; can calculate the amount of sympathetic vibration which will be caused in each part of the organism as it passes; and at last determine the formulæ by which it is analyzed into pendular vibrations, by the organs of Corti or the fibres of the basilar membrane; thus tracing it to the very verge of consciousness itself.

In turning to the perception of color, we find, that if we take into account the analogies suggested by the undulatory theory, and the greater minuteness of the waves of the light-ether, the eye—so far as explored—responds to external stimulation with far less special mechanical adaptation than the ear. Masses of white light are thrown upon the retina, the focal distance of the various colors of which it is composed differing by

twice the whole retinal diameter and six times the length of the longest rods,—every outline surrounded by dispersive and diffractive fringes, of ten times the diameter of the base of one cone; and here, with a vaguely defined, and to a great extent unverified, suggestion of three species of percipient elements, it is left.

If this were really all, and neural action had to collect the material of visual sensation in this form, and the mind, re-acting upon such aggregate stimuli, were able to project the whole visible universe of color,—while we might understand why sight should have been the favorite sense of the Spiritualistic philosophy, we should at the same time be compelled to admit that the eye is a somewhat clumsy organ. If the ultimate fibres of the auditory nerve had been supposed to be directly sensitive only to the vibrations of the fluid of the labyrinth, and if the functions of the *ductus cochlearis* and all its exquisite mechanism—which does instantly what the mathematician only lately learned to work out by Fourier's intricate formulæ—had been undiscovered, the explanation of the ultimate processes involved in the sensation of hearing would be scarcely more satisfactory than those of the sensation of color-perception now are.

Purkinje, Volkmann, Helmholtz, and others have found that if two parallel fibres of spider's-web, or two fine wires, be brought very close together upon a white ground, the intermediate white line seems to have a beaded or zigzag outline, when closely examined with one eye.

Assuming the cones to be arranged somewhat in the form of hexagonal cells in a honeycomb, this has been

explained by supposing that the retinal image of such a line is so small, that, as it falls across this musive surface, one minute section of it would excite only one cone, while the sections immediately above and below would cover halves of two adjacent cones, and, exciting both to activity, would appear twice as large.

Now, if the ultimate percipient elements be cones of three varieties of sensibility, corresponding to the colors red, green, and blue, or violet, it follows that the cones which perceive, e. g., green, must be much more widely dispersed over the retina, being at most only one-third of the whole number; and hence, with black lines upon green ground, or the reverse, we might fairly expect this beaded irregularity to be much greater than if all the cones were excited, as they would be by white lines of light. To test this, I gummed ultimate fibres of white silk upon a smooth piece of heavy black paper, as near together as I could distinguish them when the lens under which I worked was removed. By bending the paper gently backward, the fibres were drawn tense and straight. After some practice in the morning, when the eyes were fresh, or even after closing them for a minute, later in the day, I could distinctly recognize that the outlines of the white fibres were wavy, and even beaded. Now, as near them as possible, parallel fibres of bright red, green, blue, and violet were fastened, and viewed in a similar manner, under stronger illuminations. The same wavy outlines were observed, though with somewhat greater straining of the eyes. It is quite certain that the curves were no larger, and no less frequent, than with the white fibres. Thus, if the cause assigned to these appearances be the true one, and if my observations be verified, it would

seem that the hypothesis of three sets of cones must be abandoned.¹

If, then, we do really reach the ultimate possible limits of surface-perception without approaching one step towards the analysis of white light into its elementary colors, the only remaining hypothesis seems to be that they are distinguished in different planes of the retina. This, indeed, is countenanced by the calculation of Helmholtz, that, when the eye is accommodated for a white object at convenient distances, the focus of the violet rays is .434 millimetres, or twice the thickness of all the layers of the retina in front of the focus of the red rays. Indeed, on the undulatory theory, the difference of wave-lengths must itself be a function of perception, which cannot therefore take place in a mathematical plane. Analogies of light and sound at once suggested to me sympathetic vibrations of the minute segments of the retinal cones, whose diameters, according to Max Schultze's measurements, are about the same as those of the wave-lengths near the red end of the spectrum. Accordingly, the following series of observations on positive or incidental after-images, which have never been very fully investigated, was made:—

A series of bright-colored pieces of paper, four inches square, were fastened to a long strip of paste-board, in the order in which they occur in the spectrum; a movable slit, of somewhat less diameter than

¹ Of course the purest colors obtainable in silk contain the whole spectrum, and the only precaution adopted was that of tiring the eye for the complementary color before fixating the fibres. Of ten High School boys, who were induced to try the experiment for several consecutive days, and, without being told what was expected, to draw the lines as they appeared, three represented them as wavy, and could observe no difference in the size of the curves in the white and in the colored fibres.

the squares of paper, allowed any color to be seen by itself, without the effects of contrast. Positive after-images of each of these colors were formed, first by opening the eyes as suddenly and closing them again as quickly as possible, about once in a second, eight or ten times,—an experiment which was afterwards varied by illuminating the squares in a dark room by an electric spark, and later by observing, in the same manner, a solar spectrum, cast by two prisms of rock salt.

Beginning at one end of the spectrum, and trying each color successively, it was observed, that, near the middle of the spectrum, the first phase of the positive after-image is nearly or quite white.

To my own eye this effect is somewhat greater with highly saturated blue than with green, which appears dazzling white even beside white paper. No noticeable paling of red or of violet could be observed. The experiment was afterward varied by getting a positive after-image of the whole of a short spectrum at once, the middle of which still seemed nearly or quite white. Thinking that this might be due to the greater intensity which spectra formed by most prisms seem to have to the normal eye near the middle, these spectra were thrown upon red and violet paper, which absorbed most of the green rays; but still the effect was the same.

Now, if we suppose a series of sensitive elements—let us say disks, like the rattles on the tail of a snake—at the ends of the cones, each responding by sympathetic vibrations, or otherwise, to the action of waves in the light-ether, of corresponding length, the perception of white light would require the simultaneous agi-

tation of all, or at least of several groups, of these disks. Let us assume also, for the present, that these disks are arranged in a spectral order, — those sensitive to red near the point, those sensitive to violet near the base, of the cone, — each disk being transparent to all waves of greater length than those to which it is best fitted to respond. If this were the case, agitation of a group of disks near the middle of what we will call the cone-spectrum might mechanically agitate the groups on either side, and thus give rise to a wave of disturbance, which, passing to both ends of the series, would cause a sensation of white, which the agitation of either end would not do to any such extent.

Again, it is well known that pressure, either mechanically applied, or caused by retinal congestion, often causes pure colored as well as white images. This has never been satisfactorily explained on the hypothesis of three sets of cones, or rods. So far as the effects of pressure have been observed on retinal purple of fresh eyes, the effect is always the same. If we assume that increasing degrees of pressure excite waves of disturbance of increasing length, involving a larger number of disks, we can readily believe that the effects of fatigue, determining the degree of instability of different segments along the cone-spectrum, would account for the various color-sensations thus produced.

Instead of three species of terminal organs, the modern form of Young's hypothesis assumes three sets of sensitive fibres, responding to the irritations of the three ground colors. The facts of red blindness afford, perhaps, the strongest ground for this theory. According to our hypothesis, however, red is perceived in the outer plane of the retina at the end of the cones.

If we consider the delicacy and comparatively exposed position of these red disks among the coarser pigment cells of the choroid, and especially if we admit it to be proven that the two change their relative position with every irritation, we should expect that the ends of the cones would be often injured or undeveloped, as, indeed, the microscopist often finds them. How far the insensibility of the normal eye to the less refrangible red rays is due to the limit of retinal function, and how far to the absorptive power of the lens and humors, has never been determined. We should expect, however, to find some of the thermal rays just at or beyond the point of the external cone, perhaps limiting, and sometimes even impairing, its functions. Toward the violet end of the spectrum, there is good reason to believe that no solar rays enter our atmosphere which do not cause at least fluorescent sensibility in the retina.

Professor Fick has lately re-investigated the facts of the color-blindness of the equatorial tracts of the retina, and frankly admits that the phenomena he has observed cannot be explained by the absence of a fundamental color. He endeavors, however, to preserve the hypothesis of three sets of fibres by arguing that the physical constitution of the eye is such that excitation must be considered as a function of oscillation. Thus, the longer ordinates of the curves representing the maxima of each of the three sensations in the spectral series of colors approach each other as the color-blindness here becomes complete, or as the angle of vision increases: so that, e. g., a red ray, falling here, might appear yellow. Now, by assuming near the *ora serrata* either a shortening or an inclination of

the cones, so that either the red disks are absent, or not reached by their corresponding rays, these phenomena, if we take into account the chromatic aberration of the ante-retinal eye, which Fick has entirely disregarded, can all be explained in a much simpler way. More accurate observations, however, than have yet been recorded, respecting the angle of inclination of the ray to the cone, and the amount and uniformity of shortening of the external cone near the front edge of the retina, are here needed.

The peculiar relation of green to the two other colors, as shown on the leverage curve, or chart of mixing, as reconstructed by Maxwell, has never been satisfactorily explained on the hypothesis of Young. Why have we here a curve, and not an angle, as at red and violet? or, in other words, why does the mixture of any two tones of green cause such a sudden and exceptional decrease in saturation?

When we consider the almost perfect integrity with which the green rays reach the retina, and its sensitiveness to them, we should expect, not only a greater saturation than is observed in the spectrum, but also more shades and more distinct hues than we find upon the color-table. The complementary hues of green are numerous and pronounced. These unexplained facts, however, are very simply accounted for, when we reflect on the instability which the central position of the green disks would give them, and the readiness with which a wave of disturbance, starting here and passing each way, would produce the impression of an admixture of white light; while the abruptness with which the impression of green fades out, after the stimulus ceases, leads us to believe, according to the law of

acoustic sensibility in sonorous bodies, that the *green disks give sympathetic response to a greater variety of wave-lengths than the red, or even the violet*; in other words, that the sympathetic function at the centre of the cone-spectrum is less specialized than at its ends. This, too, if rays are brought to a second focus in each cone, we should expect.

Passing to violet, we must believe that the retina is directly sensitive to its own fluorescence. This, Helmholtz says, is improbable. But, if fluorescence is a property of the anterior layers of the retina, why should the eye not be sensitive to it, as it is to the retinal blood-vessels, or to the almost constant stimulation of blood-color from other adjacent membranes? If, on the other hand, the light green which has been observed in a fresh retina, under the stimulation of ultra violet rays, is due to a complementary activity of the green disks, then, of course, the mind perceives it directly in the lavender gray which may be seen by a sensitive eye among the most refrangible rays. Of course, this question is greatly complicated by the fact that the lens is far more fluorescent, and scatters light blue rays all over the interior eye; and that even the cornea and vitreous humor aid in this general dispersion. While this would impair the distinctness of every violet image, it does not seem sufficient, without adding the effects of retinal fluorescence, to account for the evanescent touch of green which appears in ultra violet rays. It is possible, though hardly probable, that retinal fluorescence is a part of the function by which complementary colors are developed.

Before the late observations of Boll and Kühne, the theory that colors are to any extent reproduced in the

eye would have been thought as baseless as the scholastic doctrine of visible species, or the Cartesian theory that colors are different rates of vortical motion. Boll now, however, not only insists that we must choose between what he terms the interpretation and the identity theories, but gives his vote for the latter. The great interest which the psychologist feels in these investigations is because this question is at least involved here. While it would be premature to say that all the observations thus far can be interpreted upon the hypothesis of a cone-spectrum, it seems quite certain that they cannot be interpreted in accordance with Young's theory. It is, of course, yet possible that retinal purple is merely protective when the retina is most sensitive; viz., after rest. It is possibly connective tissue between the disks. It is, again, quite possible that its changes are connected with the perception of light and shade, and not at all with that of color. On the one hand, the fact that pressure causes the same sort of bleaching as light; that the color is chiefly confined to the external members of the outermost retinal layer, while near the vitreous body the cones and rods are nearly colorless; the fact that fluid solutions of retinal purple can be made only by a substance which causes the disks to fall apart, in Kühne's language, like a roll of coin suddenly unfastened; its high refractive power, — all these facts point decidedly toward the photo-physical explanation. On the other hand, we must not forget that the fact that retinal purple can be dissolved and filtered; the fact that perception probably takes place long before any sensible bleaching of the retina occurs; that colors are represented only by more or less paling, and never by changes of hue in the red

substance; that it seems to be confined to the rods, and that pigment cells and the colored oil-drop in the base of the outer members seem to undergo concomitant changes, perhaps regenerative, perhaps participatory; the fact that vinegar changes the red to instant yellow, — these facts, while they do not seem, as Kühne urges, to compel the belief that the retina is a photo-chemical workshop, or that the red is independent of all structural changes, do show us that we are here on the boundary-line between chemistry and physics, and that the interpretation of each may be partial. Observations on retinal purple, and the fact that continued pressure on one eye causes all objects for a time to seem tinged with violet, would incline us to believe that the action of light on the cone-disks causes increased tension, possibly shortening instead of, or more probably along with, sympathetic vibration.¹

Volkman, Goethe, Brewster, and many others, have claimed to be able to distinguish with one motionless eye two component parts of a mixed color. Helmholtz urges that this is always a matter of judgment, and not of sensation. We are used, he says, to seeing things in the changing lights and shadows of morning, noon, and night, and by artificial illumination; and so

¹ On the photo-physical hypothesis, the almost constant action of red rays from the blood would tend to relax tension, — perhaps bringing a large number of disks into distances from each other corresponding to the length of the red instead of to that of the shorter waves, — and the retinal purple might then be due to the same cause as the color of thin plates; while the white which occurs with protracted illumination of a fixed eye would be physiologically analogous to tetanus; and the observer would see all the colors superimposed, producing the impression of white. This, again, would indicate that the phenomena of fatigue are to be explained, in part at least, by nervous exhaustion, and not entirely by failure of mechanical response in the terminal apparatus; and thus we are brought, by a very direct, scientific path, to the old question of phosphorescent effects in the eye.

unconsciously acquire the ability to judge what is due to the medium, and what comes from the object; and thus can often do so correctly the first time, when thin white paper is spread over a colored surface. Wundt urges against Zenker's ingenious theory, that we ought to see white light as mixed. Now, in the first place, it is by no means proven that the eye cannot be trained to see one color through another at a distance from it, — which is the most favorable form of mixing; but even here each shade of a composite color may have a different local sign, while, as in our hypothesis, the elastic mechanical action of disks on each other — lying, as they do, so close together that no microscope can distinguish them in a fresh retina — prevents distinct perception. Investigation is much needed here. Meanwhile, we must not forget that the retina is not the only surface where different modes of irritation coalesce in a single sensation, and that the difficulty may be solely due to inadequate cultivation of attention and discrimination.

Our theory thus involves a redistribution of the causes of many well-known phenomena of vision. We must distinguish, first, those due to direct action of light on sensitive disks; second, those due to the action of these disks on the other; and, last, those due to the neural action thus occasioned: and the problem now before us is to determine how far such phenomena as after-images, contrast, persistence of impression, etc., are due to each of these influences. Such familiar facts as that change of brightness causes change of hue; that pale and dark colors are more contrasted than those that are full; that greater intervals intensify and emphasize colors, while small differences in tone

seem most contrasted, — would indicate that contrast is not, as has been lately claimed, all a matter of subjective judgment, but that it may be due in part to the second of these causes. Complementary after-images, it is quite certain, cannot be explained by any theory of musical harmonics; for the musical fifth would give us a greater, the third a less, than the complementary interval on the color-scale. We should expect, if the disks respond by vibration, that their motion would be far less rapid than that of light-waves, corresponding perhaps as a very small multiple, or as a lower harmonic or difference tone; or, again, there may be one curve for the elasticity of disk action, or of the tissues connecting the disks, and another different curve representing neural fatigue; so that there would be two waves of excitation along the cone-spectrum, each followed at different intervals by slower, damping waves of fatigue; and it seems quite possible that the combined effects of both must be estimated in explaining all species of after-images. Many circumstances, which will readily occur to those who have followed us thus far, would lead us to believe that persistence of impressions would be found due more to the terminal apparatus than to the nerve action. The functions of the rods still remain unexplained. It has been suggested, that, as white light is analogous to noise, the functions of the rods correspond to what was, until lately, supposed to be that of the vibratory hairs or the otoliths of the labyrinth. The very fact that these disks are smaller and more numerous and more uniform in size, while they contain apparently less nervous elements, suggests indeed that their function is to emphasize position more minutely than is done by the cones.

That they do not perceive color is made to some extent probable by the fact that retinal purple, which seems to exist only in them, is not specifically modified by color as such; while, finally, if there is any reason to believe, as has been suggested, that cones are modified or developed rods, then the surprising theory of Hugo Magnus, which is so strangely countenanced by philological facts, — viz., that the color-sense has been developed out of simple perception of light and shade within the historic period, and in the spectral order, beginning with red, and with some corresponding loss in the accuracy of form-perception, — has at least one physiological fact in its favor.

Many other possible but unverified analogies with the ear are suggested: e.g., may there be found any such correspondence between the length or number of cones, and the brilliancy of colors developed among lower animals — and especially birds — by sexual selection, as has been observed between the length of the *ductus cochlearis* and the development of songs and love-calls? Is there any special reason why, as the lower notes affect only the vibratory fibres most remote from the entrance of the labyrinth, so the red rays pass the other sensitive disks, to be perceived at the farther end of the cone?

It is high time to remember that our theory can be called, at most, only probable, until the course of the rays through the retina can be more accurately traced. First, let us suppose light to undergo a special and final refraction, in the substance of the retina itself, before it is perceived. This is rendered highly probable by the great refractive power of the cone substance and of the retinal purple; by the fat globules and lentiform

bodies observed in the cones of birds and reptiles ; and by the bright appearance of the points of the cones, as seen from the back of an illuminated retina. This would be necessary, if rays of each color were to be focussed on their appropriate disks. The distance between the focus of red and that of violet, as formed by the lens and humors, would then have to be reduced to, let us say, one-fifteenth its estimated extent. This, again, would require such a dispersive surface as would bring rays, coming to different foci from different directions, into approximate parallelism, and, finally, a very strongly converging, and at the same time dispersive, power. Both these problems are theoretically solvable by the calculus of geometrical optics ; but there still remains some doubt whether such a surface as is required in the first lens could really exist, and whether any known substance combines the high degree of refractive and dispersive power requisite for the second. It is, of course, conceivable that a substance might exist which should refract rays of one end of the spectrum, and transmit those of the other unaltered ; and it is, again, very probable that each disk has a refractive power of its own. But, fortunately, none of the above suppositions are necessary. We may suppose that each disk responds to its own ray, from whatever direction it comes. In that case, the tardy action of red rays in producing their maximum sensation might be explained, in part, by the smallness of the red disks.

It is by no means necessary, as was assumed by the critics of Zenker's theory, that the thickness of the disks should in any way correspond to the length of the waves of light, or even that the phenomena of in-

terference should be invoked. The difference may lie solely in size ; it may depend on the angle of incidence ; or, again, there may be such a special sensibility among the disks, and such minute accuracy in the refractive apparatus, that every red ray is thrown directly upon the sensitive point of its own disk, and that even another ray thrown there would seem to have the hue corresponding to the disk. All we want is a ponderable ether ; while the fact that millions of vibrations are necessary before the faintest trace of color can be perceived sufficiently indicates its tenuity as compared with the medium of sound-waves.

The number of disks must be, at least, several hundred. Aubert was able to distinguish one thousand hues in the spectrum. Goblet and Rood believe we can learn to distinguish many million hues and shades. So it is probable that we shall here have to resort to the same explanation which Helmholtz gives of the fact that musicians can perceive one sixty-fourth of a semitone, which is less than the difference between the pitch of two of Corti's arches. In the one case, the two disks, as in the other the two arches, nearest attuned to the wave-length, would be excited, — the nearest one the most strongly ; so that we shall never be able to perceive the steps or jumps which correspond to the ultimate percipient elements in either the tone or color scale.

The histologist Hensen long ago conjectured that perception took place at the outer segment of the cone, because the field of vision is made up of points so widely separated in comparison with their diameter. It has more recently been urged that the cones are not nervous substances, and that no fibres can be found

running from their external segments. To this it can only be said, that, if the size of the fibres bears any proportion to the length of the wave, observations on the ultimate nervous elements of the ear would teach us that comparatively large bundles of ultimate retinal fibres would still be invisible under the highest microscopic powers. The two hundred and fifty thousand fibres of the optic nerve may themselves be very complex. Our theory only adds a third to the two yet unexplored intervals along the diameter of the retina, which all who believe that the cones share in the act of visual perception admit must be somehow traversed by sentient processes.

If, then, certain phenomena, like colored shadows, or the subjective light of the closed eye, and many others, may be partly explained by the action of disks on each other; especially if colors shall be found, in any sense, to be reproduced on the retina, — it may be that some of the many ingenious but mistaken color-theories which have abounded in the world ever since Plato's day may have something to teach us which has been overlooked: for instance, Schopenhauer's, which has at least the merit of being purely physiological, while his formulæ of divisible remainders and of qualitative and quantitative retinal activity may be applied at once.

Chodin's observation that moderate pressure always excites a sensation of green, whether on a black or white ground; Wheatstone's discovery that on a smooth surface of red and blue squares the red seem raised; the fact that a distant landscape viewed with inverted head seems more like a flat surface, but more brightly colored, so that color and the third dimension of space

seem reciprocal functions, — these and many other observations seem more or less fully explained by our hypothesis, which at least suggests new paths of investigation, and may perhaps even justify the question how much better, at this stage of our knowledge, we are really fitted to decide whether a color-scale is possible, than musicians who lived when a three-stringed harp was the most perfect instrument, were to discuss diatonic intervals.

THE PRESENT CONDITION OF PHILOSOPHY.

PHILOSOPHY in Germany seems to have reached its lowest ebb a little more than a quarter of a century ago in the re-action against absolute idealism. The "conspiracy of silence" against Schopenhauer was not yet broken. Hartmann, as his autobiography shows us, was still in the second of Shakespeare's seven ages of man. Lotze, Fechner, Trendelenburg, Zeller, Fischer, on the one hand, and Brücke, Helmholtz, Reymond, Ludwig, the now famous pupils of E. H. Weber and Johannes Muller, who with their co-laborers have founded the new psychology, on the other, had only fairly begun their career of discovery. Herbart was slowly but surely becoming a mighty influence by stimulating more than by indoctrinating his readers. Schleiermacher was read scarcely more than now; and the "*Gemüth-religion*" was, as it has been ever since, but little understood even by his countrymen, partly because it has always been so modified and even perverted by his pupils, especially by Dorner, and still more because it occupied the broad middle ground between the two all-seeductive extremes of Strauss and Feuerbach on the left, and Hengstenberg and the orthodox re-action on the right. The cry, "Back to Kant!" which has now made his works in some sense a philosophical septuagint, had

not resounded. The claims of many academic teachers for the supremacy of speculation were never more absolute, and never more unheeded. Most of them stood in the unphilosophical condition of more or less avowed pupilage to some one of the systems of the heroic age of idealism, the influences of which were far too pervasive and dominant for free individual development or for independent criticism or even history. More than any other existing philosophical periodical, the "Halle Zeitschrift" now occupies the standpoint, and discusses the questions, of this period.

If we extend the view to France, we find that, in spite of the Revolution of 1850 and the influence of Fourier and Simon, the dead official eclecticism of Cousin, which considered philosophy a shop, and opinions ready-made furniture among which each could pick and choose at will, was still dominant, although it had already begun to lapse from a rigid, almost priestly censorship, to the literary standpoint, from which, according to Renan, all truth is best seen in a play of light and shade, and God himself is found to be nothing more substantial than the *category of the ideal*. Positivism, which has since taken so deep a hold on French scientific men, was comparatively unknown. In England and the United States, Hamilton, Butler, Paley, Edwards, and of course Aristotle, and to a less extent Plato, were widely read and studied. Most admirers of Coleridge considered him as an isolated prodigy, and were unaware how directly he drew from German sources, particularly from Schelling. Berkeley was sometimes seriously, and more often curiously, read, and his idealism no less often misunderstood and even caricatured. Hume's philosophy was widely discred-

ited by his religious opinions. Locke was everywhere read, but generally with a certain not purely philosophical reservation. Reid and Stewart were still classic. Abercrombie, and even "Watts on the Mind," were at least respectable authorities in the schools. If not always physics, philosophy often did signify little more than sound common sense. Materialism and idealism were the Scylla and Charybdis of independent speculation; but immoral as the tendencies of the one system, and insane as those of the other, were deemed, German pantheism, which had begun to loom vaguely and awfully in the background, had more tragic sublimity than either; for it lay far beyond the boundary-line in passing which reason must forever lapse into irretrievable error and infatuation. Self-knowledge was highly spoken of; but there was a prejudice against every sort of self-study or introspection as unpractical and paralyzing, save in a purely religious or ethical sense, which was simply superstitious. This standpoint is still very common in many of our smaller colleges.

If we turn from this picture to note the present condition of philosophy, we find an advancement so great that, had it not been uniform and general, it might almost be termed revolutionary. The old philosophy ending with Hegel, or often even with Schopenhauer, is now taught almost everywhere only as history, and very rarely indeed, save perhaps among the new Kantians, as living truth. Even while renouncing the speculative method, and by the creed, *ignoramus ignorabimus*, abandoning as hopeless all attempt at further progress in that direction, the present generation has seen a great number of new and vast questions arise, take definite discussible form, and become accessible to scientific

methods, till in many cases they have been more or less satisfactorily answered and settled,—questions, too, which until recently seemed hopelessly remote and vague. The number, vastness, and practical importance of problems open to scientific methods was never so great as now, and the interest in them never so profound and absorbing. Lectures on physics, mathematics, and mechanics, are introduced by discussions of logical method; and text-books on history, biology, and even on muscular contraction and neural physiology, are not unfrequently made *tendence* works, and end in philosophical inferences respecting human life and faculties. Thus it comes that while we have not entirely ceased to hear on the one hand complaints of the decline, or on the other exultation over the collapse, of philosophy, by those of retrospective cast of mind, those who are quick to the influences which are now pre-forming the near intellectual future are persuaded not merely that in new terms her problems are again becoming everywhere supreme and central, but that a new conception of the universe and of man's place in it is slowly taking form, which, when it at last becomes coherent and general, will give to reason a new cosmos from a new stand-point, and will involve momentous and far-reaching practical and social consequences. As it has happened that those who were most deeply Christian have broken with instituted religion, so now sometimes those most truly philosophical exclaim most vigorously against metaphysics and speculation in the sense in which these words were formerly understood.

We are still too prone to judge progress in this field by the number or many-sidedness of individual systems.

Than these nothing is more unphilosophical. They lead men to consider the universe as far too simple and easily understood. They flatter the mind with a false and delusive sense of finality. Individual and even provincial in the all-encompassing world of thought as they are, some of them have developed bibliolatry and partisan strife, and have thus done almost as much in the latter stages of their influence to hinder as in the first they did to quicken and stimulate thought. Like every dominant hypothesis, they always illustrate Schopenhauer's primacy of the will, making us lynx-eyed for all that favors and blind for all that opposes them. Now also the work of system-making has become forever impossible to the individual thinker. Not only has the intellectual world become far too large and heterogeneous for any one mind to make respectable generalizations about the whole, but the new criticism and historical methods have shown that personality is too limited in its essence for this to be possible. Even Professor Zeller, since his philosophical regeneration, declares that philosophy, as it is, is the University, so organized that each professor and each department stands nearest to, and can most help and learn from, the one next allied in method and subject-matter, and that thus the latter should not be a cluster of special schools or sciences, but that both teacher and student should be pervaded by the feeling if not the consciousness of the organized collectivity of all knowledge. At any rate, education is the most important and the most practical of all the questions of philosophy, and is the field for its most immediate application. Some brief system may give happy utterance to some thought of the *Zeit-Geist*; but as such it is the most transient,

though it may be at the same time the most serviceable, of all forms of intellectual work. Progress is rapid, and facts are solvent; and almost ere a system of the modern order, built of one negative principle and one hobby, is complete, it begins to crumble, and the ground is soon cleared for another.

We still hear, especially of course in our country, the old reproach that philosophy has no practical bearings upon life. It is certainly at present, and in a business point of view, the worst possible investment of time, money, or mental effort; and yet in Germany philosophy has expressed and moulded character scarcely less than Puritanism in the United States. Admirers of Kant, Hegel, and Schopenhauer are as different and marked individualities as thorough-going Episcopalians, Methodists, Presbyterians. But leaving the old metaphysics, we prefer to say that as far as old sanctions, laws, systems, and institutions decay, and so far as men are capable of being affected by rational considerations, just so far philosophy is becoming, and is sure to become, the dominant influence in the intellectual world. Men crowd together in cities, in industrial associations, cling to the distractions of business, the diversions of society, and the formal organizations of creed and worship, philosophically speaking, because there is no other higher unity; because as a race, man was never so isolated, though but half-consciously, in the universe, so uncertain of his origin, nature, duty, and destiny, because he finds no personal fellowship in nature and no satisfaction in the contemplation of a transcendent world. How inadequate to his needs the alternative, the pessimistic undertone of modern thought and life reveals and measures. Men are rest-

less and greedy of immediate and material good, because they doubt the existence of any other. Instead of being unpractical, according to the standard reproach, we have no fear but that philosophy is all too soon becoming the greatest and most pressing of all practical needs, social and political as well as personal and moral. The decay of faith brings the individual face to face with ultimate questions, and leaves him in the primitive condition of being his own thinker, with no division of labor in the vast and widening intellectual field, with no mediator, no confession, and even no consensus, save the truly socialistic consensus of the incompetent, on every special and professional question, with no positive principles save the vague and commonly misunderstood generalizations of popular science and evolution, and probably disparaging or perhaps doubting the very existence of those dominant intellectual forces in the world which make his whole mental and moral life their sport. Man is the prey of circumstances in proportion as he is ignorant of them; and the so-called new ethics, which, in this age of deepening consciousness and widening knowledge, makes him the creature instead of the controller of his surroundings, is the apotheosis of a self-ignorance, now fortunately becoming as impossible as it is always and everywhere unphilosophical.

In the special sciences laboratory work and mechanical methods are becoming more absorbing and essential, and, for the average observer, more in danger of becoming finalities. Labor, too, is growing even more technical and special. This is most salutary and necessary; but so much the broader must man's culture be made, or dwarfing on the one hand and fanaticism on

the other, will result. As the microscopist must turn to study the laws and capabilities of his instrument whenever the limits of visibility are neared, so half a dozen sciences have already come to feel the need of turning to the study of the instrument with which the observer works, — the mind; and the greatest interest now centres in psychology, which opens to the specialist a field of unexplored breadth and richness. Even the workingman instinctively re-acts against the narrowing tendencies of machine-work and special skilled employment, and speculates wildly and crassly about political, social, or religious problems. The religious mind has probably never been more accessible to matured philosophical truth than now; while the organization of education, from the kindergarten to the university, — the most immediate practical field for philosophy, — is again coming to excite a deep and promising interest. Indeed, the circumstances and tendencies which point to or illustrate this general revival of philosophic interests are far too many to enumerate here. We have no hesitation in predicting, within less than a score of years, a radical rehabilitation of the philosophic methods of instruction in most of our colleges, which do not fall hopelessly behind in the yet sharper struggle for existence which now seems inevitable for so many of them. A true teacher of philosophy can now excite an interest more absorbing, and mould the intellectual character and career of most students to a degree, hardly suspected hitherto; a fact which should bring a heavy sense of responsibility to himself, and which is worthy the careful consideration of educators.

We have exceeded our limits, and have no space left to recount the work already achieved along the line of

philosophic advances ; of the new terms, starting-points and conceptions of matter, force, attention, consciousness, association, language, logic, ethics, etc. To this, however, we shall recur at length later.

FIRST IMPRESSIONS ON RETURNING HOME.

Not only is the number of Americans who visit Europe for the various purposes of culture rapidly increasing, but the mental discipline and assimilative power of those who go, which has been poor enough too often in the past, is steadily improving. The impressions with which young men and women return to and re-acclimatize themselves in their own country, after a year or more of foreign study, are not only very important factors in their own careers, but are likely to become of no mean significance for our national life and thought. They are complex, various, and some of them trite enough.

To begin our inventory of them in the harbor, — differences in latitude and meteorology have made our country, perhaps, the lightest in the world. The clearness of the atmosphere, the great number and (as compared with a corresponding climate in Europe) the length of sunny days, here, the distinctness of distant outlines, the brilliancy of all nature's colors, from sky and foliage to complexions, have combined to develop here an eye which is remarkably acute, quick, and free from defects, and which, it has been argued with plausibility, has been an unusually dominant influence in the development of the American brain and character, anal-

ogous to the high development of the auditory sense in Germany, which inclines to mysticism and sentimentality. How much this has to do with the American's dislike of an out-of-door life, his tastes in art, dress, and manners, his confidence in first impressions, etc., we hazard no opinion here.

The dryness and purity of our air form another salient characteristic. The hair, skin, and beard grow dry (partly, of course, from other causes), we breathe a trifle faster, the heart beats somewhat quicker, and all vital processes are accelerated. We consume our reserve physical forces, and overdo more frequently, easily, and unconsciously. The nervous system begins to grow more active; and perhaps we feel less poise, a slight sense of restlessness, and haste grows not infrequently on a nervous person. In some cases beer and wine, which may have been used constantly with impunity abroad, must be given up on returning. If we rest, we find ourselves beating time with hands, feet, or head, or, instead of storing it up, love to let our surplus energy trickle off by the intermittent propulsion of a rocking-chair, an abomination almost unknown on the Continent. Our very speech often seems a trifle more rapid and emphatic; and our gestures, if we are in the habit of gesticulating, are a little more florid and demonstrative. The appetite improves, digestion is quite commonly better, and ladies have assured me that their complexions were benefited on returning. I have seen a file of one hundred and fifty small German boys just as they marched out of the schoolhouse at noon, almost unbroken a quarter of a mile away; and I observed several hundred little girls at the Victoria School in Berlin, during an outdoor recess, and

did not see one run a step or do any thing a lady might not have done, although they were allowed perfect freedom. Here, even older schoolgirls play very active and often exciting games, or, what is worse, get together and giggle uncontrollably : this, for a type of constitution quite common here, is nothing less than a mild form of debauch. Pedestrians, cars, and even horses, go faster. Feelings, passions, desires, and ambitions, are more intense, and expressed with less restraint, and most of them gratified more freely. For any other temperament the alternative of teetotalism or inebriation would be absurd : here it is often real and pressing. Finally, every young man feels that if he do not become President it will be because he did not try to be, or else because his own abilities are at fault. These are some of the causes why we are the most sanguine, the brightest, most plucky, and perhaps most cheerful people in the world.

Again, we are perhaps the hardest workers in the world. Whatever he may say of its quality, the German official or man of business is always appalled at the quantity of work his compeer here can turn off in a given time. We may be born larger, carry less flesh, mature earlier, dry up and decay younger, than the Germans ; but in despatch, executive ability, impromptu practical judgment, we as far excel them as they excel us in science and philosophy. Business here seems to not a few Germans of average intelligence with whom I have conversed only as a grand money-hunt, which is so absorbing that it leaves men no leisure for culture, domestic enjoyment, or even for needed rest, eating, etc. The most popular of even our festivals, it is said, is an industrial exposition. No nation so young

was ever so rich, although less wealth has ruined maturer ones. The fact, that, to use a current though unscientific distinction, business is developed disproportionately to industry, causing crises and re-actions, occasions no doubt, on the whole, more unscrupulousness, and want of thoroughness and conscientiousness, in trade than in Germany. Outside New England, almost our only aristocracy is based on wealth. The maxim, "Get on, get honor, get honest," which implies that the kingdom of heaven is to be sought last, after all other things are added, is perhaps, on the whole, as fitting a national motto as the tedious "Time is money," which is sputtered in half a dozen brogues all over Europe, by thousands who know no English but those words, at restless Americans. Indeed, the extent to which business considerations have come to control politics, education, and even the Church, seems one of our most marked characteristics to a temporarily denationalized American upon renewing his citizenship at home. Nor is even this quite as deplorable as is often assumed. We believe, on the other hand, that, by establishing these institutions upon the most solid if the lowest foundations of interest, this will prove the beginning of a new and at last advantageous departure, unfavorable as it seems at present.

Politics here, it must be confessed, is not entirely a matter of science, principle, or patriotism; neither is it just, on the other hand, to define it as only a periodic tussle between salaried place-men and unsalaried but hopeful place-seekers, whose competition for votes is a school of immoralities for young men, as I have heard it characterized abroad. Nothing is, of course, easier than for a foreign resident to collect abuse and

detraction of his own country if he will listen to all ignorant or individual utterances. But the incidents of residence in a friendly foreign land bring the merits, at least no less strongly than the defects, of his own to mind. For weeks after our vessel touched the shore, near the close of one of the most important and ably-conducted of our Presidential campaigns, we realized most vividly the difficulty, far greater than elsewhere, in getting at the main and real facts which should determine the ballot of a thoughtful and intelligent man. To be sure, the country is great, and the interests involved in every election are rapidly increasing in number, complexity, and importance, so that the injustice under which minorities suffer is greater and more widely spread. But the number and enterprise of our newspapers is so great, that, but for their partisan or personal character, they would, no doubt, be adequate to the needs of our institutions and of the candid voter. As it is, we doubt if they are.

Again, a decent reputation is less indispensable, and is possible on less moral capital, in all respects save one, here than in Germany; and, frequent and complete as *bona fide* exposure is, it has proven a less potent engine of reform than was once hoped. The necessity of party machinery for the government of a country like ours must now be patent; and, until reformers learn to curb centrifugal individualities, so instinctive, for brave and good men, — which, indeed, motivate their very protest, — and organize a good and efficient machine of their own, the political organizations of men who sacrifice character for reputation are not likely to be superseded or broken up. The natural and wholesome division of parties, into pro-

gressive and conservative, is lost sight of. The framers of our Constitution entertained almost theocratic conceptions of a democracy. The right of suffrage, — although never conceived of, in the ideal sense of Plato, as almost equivalent to an university degree conferred only upon the wisest and the best, — they designed to be exercised by communities such as no longer exist, save in small New England villages. It is the defects, or perhaps rather the abuses, of our political system, which, more often than any thing else in the writer's experience, put Americans to the blush abroad whenever their Government is frankly and intelligently spoken of; yet even here hope is at the bottom of the casket. So great is the political sagacity of the American people, and so soundly loyal are they to the cause of good government, so far as its laws are understood, that there is no ground for fear that these evils are more than transitional, even though we have at present no very well-defined idea of just how or whence the remedy is to appear.

Every thinker of psychologic insight must regard Christianity, at least in its leading motives, as the highest and most philosophical common sense, adapted to the practical needs of ordinary life. The essential divinity of the highest form of human nature, its supremacy over the physical world, the great moral power of love and self-sacrifice, the remote and cumulative consequences attached to our good or evil deeds, — these and many other truths, which it took ages for even the wisest to learn, and which so few yet realize, are nowhere taught so effectively as in the New Testament, and in the best literature which it has inspired. In Germany the long neglect of these truths has at last

forced upon many there the conviction that the Fatherland must eventually choose between Christianity or social, if not political, anarchy. Here, on the other hand, political prudence, pre-occupation, and the unpleasant or even damaging re-action, of some sort, almost sure to follow the frankest expression of the most honest doubts and divergent convictions in most communities, has caused a general reticence about church matters as the most convenient *modus vivendi*, except by those whose occupation it is to teach some form of orthodox opinion. We have not yet reached the conviction so common there, that, apart from the question of the absolute truth of its doctrines, both they and the Christian cultus are peculiarly adapted for the youthful mind; and that men may be strengthened in an early stage of mental growth by implicit faith in them, as in a maturer stage they are no doubt often strengthened by breaking the fetters of youth. From the time of its first conversion Germany has never taken kindly to the claims of absolutism, either of authority or of belief, so strongly put forward by the Church. Sunday, the creed, and the supernatural elements of Scripture, and the external tests and names of the Christian life, are far less emphasized than here; but the Christian sentiment, or *Gemüth*, is more generally and successfully cultivated, both in school and church. Here, the influence of Puritanism and of our many slightly-differing sects have brought doctrinal points strongly into the foreground; and, since Theodore Parker, our Church has had no criticism of generally acknowledged power and competency. This has been unfortunate for its own most cherished interests. Throughout most of its past history, an accordant and

indorsing, though more or less independent philosophy, has been regarded as one of the strongest bulwarks of the Church, or at least as a friendly, idealistic ally, making common cause against current forms of materialism in thought and life. The history of the foundation of the chairs of philosophy in the universities of Europe is the best witness of this. Here, however, the most ideal philosophers — even Hegel, who declared prayer to be the highest act of the human spirit, and who has reconciled scores of cultivated men with Christianity; and his right wing followers who only attempt to explain to reason what orthodoxy asserts in a more adumbrated way — are suspected by religious leaders, lest they short-circuit the process they have themselves prepared for the pious Christian soul, or teach conscience to taste and discriminate motives without the aid of dogmatic flavors.

The voluntary system, and the familiar personal relation between pastor and people, make it harder than ever before for the former to say what is unpleasant or really instructive to the latter. Pure religious edification is now rare; while the sensationalism which draws a crowd, or the sentimentality which pleases the young ladies, who are the dominant influence in so many churches, or the superficial science which is made so consoling to those who are in earnest enough to doubt, have weakened the influence of the pulpit. Sermons are yearly growing shorter, fewer, and feebler; while Sunday-school, social, and home missionary work increases in amount and in relative importance. These, with prayer-meetings, revivals, the doctrine of the change of heart,— all of which are peculiar institutions of American Christianity suspected by the best teachers

of religion in Germany,—fairly reflect a phase of our national religious temperament, and are generally as unknown and as incomprehensible on the Continent as the callow religious philistinism too often found in the Young Men's Christian Association. One trouble is, that Christian workers labor chiefly for those below them in intelligence, and that comparatively little pains has been taken to make the Church attractive or even comfortable to men of good taste and culture, and of most profound religious nature, who really wish and need its ministrations. Another is, that no amount of Bible-study under the guidance of the trivial scholastic and assumptive methods of most of the union question-books which we have examined, and which are now used in Sunday schools all over the country, can give as much solid knowledge of the Bible, or cultivate as much real piety of heart, as the two hours per week devoted to the Bible in the German common schools by a sounder and more practical pedagogic method and by competent teachers give to all children there before they are wanted in the church. Again, there is no doubt that many of our best and most useful religious teachers do not venture to "go as far with their hearers as they have gone with themselves," toward a more liberal faith, even at the risk of being charged with insincerity. They shrink from "lightening the strain of faith in these days when faith is hard," because they fear bad moral results. Nor is this fear entirely groundless; for so uncritical and indiscriminating has been the religious training of perhaps a majority of church-members here, that if they once come to doubt the literal truth of the story of Jonah, or of the miracles, they find themselves not only at sea concerning

all fundamental religious truth, but even the ethical sanctions of a good life seem to totter. Again, it is no doubt a breach of trust as well as etiquette for a clergyman who is hired to preach according to a certain creed to suddenly use his pulpit and take his unwilling hearers' money, even for a single Sunday, in demolishing their creed.

True religious culture should begin in the cradle. Love, gratitude, reverence, the corner-stones upon which religion rests, must be first cultivated toward the mother, or they can never be adequately experienced later toward God. Not only the mother, but Nature, stands in some sense *in loco Dei* to the child. Thunderstorms, the heavenly bodies, etc.; train the religious nature of childhood. Perhaps all children are more or less pantheistic; and that may be a necessary stage of preparation for a purer faith. Religion is not a conquest, but a growth. This religious teachers are apt to forget in their haste for immediate results. It is the slowest, because the most comprehensive sort of growth; and the religious nature of most children who are converted before the age of adolescence is seriously injured, and probably its development is arrested. Hence the strange falsetto "notes" often heard in the religious experiences and utterances of otherwise adult and healthy men and women. Most educators agree that the child must repeat in its development the chief stages through which the race has passed. Why is this principle outraged in the most important department of education? When the new life of adolescence suddenly expands the soul of youth, the most important period for the educator to study,—then the course of religious training should be brought to a

head, and given a personal application according to the parents' creed. Then it is apt to be sadly needed here, where so little provision is made for this crisis which comes with such exceptional suddenness to the American temperament. For an adult Sunday-school teacher to go from the closet tingling with self-consciousness, which has become the pest of American childhood, and with only the feeblest intellectual preparation, to inoculate children with his or her own adult neurological states, is simply an abomination. The period when the child Jesus entered the temple is early enough for any child to go about its Heavenly Father's business. Then every German boy and girl is confirmed. The shallowest doubts overturn the whole religious structure here so easily, because it is built on the sand.

However much the leaders of the Church may deny or ignore it, it is nevertheless true, that among the more uncultivated and also among the rural church attendants and members, the influence of Spiritualism is slowly but steadily increasing. The Rev. Joseph Cook's postulate of tangible laboratory proofs of immortality, and his intimation that the materialization of hands, and the transition of a conch-shell through the wooden bottom of a chair, made the fingers that wrote upon Belshazzar's walls, and Jesus' passage through closed doors, seem more real to him, is only one conspicuous illustration of this tendency. Modern Spiritism is the refined quintessence of the superstition of ages, so vast that in comparison with them the historic period is but a day. If there have been centuries of civilization and enlightenment, it is because this darkness has here and there lifted for a space. It

settled very thickly again in the first Christian centuries, as cabalism, emanationism, neo-platonism, etc., with their hierarchies of spirit-hosts, Romanizing the Church, strangling natural and medical science in the third and fourth centuries, and later bringing darkness, plagues, moral corruption, paracelsianism, etc., from which we are now struggling to emerge. It has always hitherto been the common enemy of the Church and of science, both of which we have lately heard challenged to accept its fundamental facts, in a way, too, which would give to Spiritualists the greatest prestige within the Church. Recent events there have brought this whole subject to the notice of the leaders of religious thought in Germany, every one of whom, without exception, so far as I was able to learn, regard every form and degree of Spiritualism with the strongest aversion.

While the discussion of doctrine is no longer tolerated to any great extent in the pulpit, and while many pastors ask of their church-members next to no creed, or simplify the rigor of previous tests of conversion to gather many into the Church on the very easy terms of a certain emotional emphasis, or ictus, upon which our entire church cultus now so largely rests, there are yet certain dogmatic radicles, clung to tenaciously with the whole vigor of the will, and which are no longer opened or trusted to rational discussions. From a philosophic standpoint, and upon the whole, we consider it as most fortunate that our instincts have led us as a nation no farther from the old Puritan faith. In New England, at least, orthodoxy might almost be claimed as an element of patriotism, without, at the same time, by any means undervaluing the noble im-

pulses and insights with which the Unitarian movement started. The political problems to which this nation has devoted its best energies are new and vast enough in themselves, without complication with the still vaster problems of belief. We are unable to see any valid reason why good and cultivated men should withdraw from the Church because they are dissatisfied with its leaders, which would not also excuse them for turning their back upon politics because it is now controlled by bad men. Not to argue this out here, however, the terms of the religious problem are too vast for our present culture; and we believe it is the wisest instincts of the best men which incline us to delay the opening of it prematurely, lest other important results already secured should be imperilled in the sudden heat and light. The Church in this country is likely to need at no very distant day the sympathy and support of all good men in an impending work of re-habilitation. May she be philosophic enough to see her need of this support in time, and may thoughtful men understand still more profoundly that all religion is originally, and ought always and everywhere to be, only the practical side of the ripest philosophy! Rigorous religious observances and beliefs are an instinctive necessity for a people devoted like ours to trade and industry. This has been manifest throughout the history of religions. Even the Jews themselves, to whom we owe our faith, were a commercial race. The motives and re-actions which explain this are patent enough to psychology. In a word, then, the great and oft-disputed religious differences between Germany and this country seem to us complementary of each other's merits and defects. We have learned to extract a vast amount of practical

good from faith, which Germany has not done ; but we have materialized and sentimentalized it at the same time. On the other hand, German rationalism, while it may modify, does not undermine ; and German criticism, while it may well make us serious, only reveals to those who can think, new and stronger reasons for belief in the fundamental and universal validity of essential Christianity, which we must reserve for another occasion to enumerate in detail. The evils we complain of are—most of them—clearly seen and most deeply deplored by older clergymen, who are well saddened by the innovations of the younger schools of preachers ; but they do not see so clearly that the only cure for the evils they complain of is no less radical than the deepening of the religious consciousness, by the study of precisely these German methods and results of investigation they all so much fear. Most of the popular refutations of Tübingen are by those who have gone only far enough to realize their own doubts and fears, and not far enough to see that the concessions demanded are after all only formal and superficial when compared with the profundities of faith, and that the substance of the Christian faith is not merely left intact, but is greatly brightened and purified. We have made religion too positivistic in this country, and forgotten that most things and doctrines that can be proven can also be disproven. We have sought, as Lotze expresses it, to confer upon even the fundamental religious truths the honor of an exact demonstration, instead of leaving them to that region of the soul where they can be clung to by the whole heart. Finally, these strictures are made from within, and not from without, the Christian Church, and with

the most sincere desire to advance her best and highest interests.

Although the education of most of our girl graduates is inferior to that of college-bred young men, it is probable that nowhere unless among the French peasants is the wife of middle or advanced age so often the intellectual superior of the husband, as here. Nowhere certainly is woman less dependent on marriage for a respectable livelihood, nor has she won in a fair competition with man so large a place in trade, industry, and the work of education. But woman's task was never so great as here. Domestic life is not yet made adequate to the needs of the young American temperament. Instead of the many-sided knowledge of the needs of infancy which the mature German girl feels impelled to seek by voluntary service in the kindergarten, or which is transmitted to her from her mother, or through judicious reading, the American girl is too often allowed to fritter away health, beauty, and temper, for the sake of a pitiable and useless half-culture in ancient languages, mathematics, sciences, etc. The education of German girls is more uniform and far less often special and technical. They know drawing, modern languages, music, their own literature and history, one or all, better than ours. In Germany it is widely and seriously held that she is the best woman of whom least is publicly known, and who can bear and rear to school-age the best children; while nowhere have married women sought so many ways of escape from the great rights and duties of maternity as here. Instead of guiding their children with superlative care during the nascent period of young manhood and womanhood, parents here often look helplessly or even

unsuspectingly on, and see the sudden flood of new and strong feelings, which heralds maturity, bear their children away into intemperance or into other and nameless vices. The writer can certainly not be accused of undervaluing education for men or women, has no theories about woman's sphere, and still less would he see her made over according to German patterns and ideals; but he is convinced that American women must share with their husbands the responsibility for the fact that certain forms of nervous disease and degeneration, with peculiar symptoms almost unknown elsewhere, are so prevalent here, that sound family constitutions transmitted to the fourth generation are so rare, and that the American race, which ruled the country a century ago, is dying out in so many sections of our country. Perhaps the very education she is now persistently seeking will eventually be turned to better account in enabling her to solve her own peculiar national problems here.

We have reserved no space to note our first impressions of our schools, to speak of our physical conformation, — e.g., of the depth of brain from front to back, and its relative narrowness from side to side, and of our slenderness in the region of the *medulla oblongata*, — of our agility and wiry endurance, of our strong tendency to mysticism in all fields of thought not purely and immediately practical, of the tyranny of public opinion, and the half-culture which overrules specialists upon so many questions of public interest, and is so persistently indifferent to others. All our impressions, indeed, are familiar enough to thousands who have felt but never taken the trouble to note them. It would have been an easier though perhaps less prof-

itable task to have noted the many other and more purely satisfactory first impressions as they arose upon returning after a period of comparative isolation from home influences. This, however, we feel to be needless. The most unfavorable aspects of our national life can be squarely faced, not only without lessening our patriotism nor cooling our optimistic ardor, but without a shadow of alarm or discouragement. The former, indeed, rest upon something deeper than institutions or even present character; viz., upon the bottom forces of growth and development. Man here is simply not yet entirely in harmony with his environment; and therefore still further transitions, perhaps of a rapid and rather incalculable sort, may long continue, before an equilibrium which even our national and precocious faults are a desperate attempt to restore, is established. That it will eventually be established upon a higher plane than the world has before seen, we think there are the strongest reasons for hoping and believing. At any rate, the writer has never experienced the sentiment of national pride and patriotism so vividly as in turning from aspects of foreign culture to the interests and prospects of his native land.

